METER HAVING POST-MEAL TEST-TIME ALARM

FIELD OF THE INVENTION

[0001] The present invention relates generally to meters and methods of using the same, and more particularly, to a meter having a post-meal test-time alarm for notifying a user when it is time to measure an analyte concentration following a meal.

BACKGROUND OF THE INVENTION

[0002] The quantitative determination of analytes in body fluids is of great importance in the diagnoses and maintenance of certain physiological abnormalities. For example, lactate, cholesterol, bilirubin and glucose should be monitored in certain individuals. In particular, determining glucose in body fluids is important to diabetic individuals who must frequently check the glucose concentration in their body fluids to regulate the glucose intake in their diets.

[0003] Diabetic individuals often test their blood glucose levels via a blood glucose meter. Health care professionals recognize that it is particularly important for a person with diabetes to test his or her blood glucose level about two hours after a meal. This length of time after a meal represents the time frame when blood glucose levels typically spike and can cause the most harm. Thus, it would be desirable to have a meter that provides a reminder or stimulus to the user to check his or her blood glucose level about two hours after a meal.

SUMMARY OF THE INVENTION

[0004] A meter is disclosed according to one embodiment of the present invention. The meter is adapted to determine an analyte concentration reading. The meter includes a display adapted to display information to a user of the meter. The display includes information directed to a post-meal test-time alarm that is adapted to remind the user to obtain a post-meal analyte concentration reading. The meter includes at least one user input mechanism adapted to allow the user to activate the post-meal test-time alarm.

[0005] A method for using a meter adapted to determine an analyte concentration reading is disclosed according to one embodiment of the present invention. The meter has a display adapted to display information to a user. The method includes the acts of displaying information

relating to a post-meal test-time alarm, activating the post-meal test-time alarm via an input mechanism, and sounding the post-meal test-time alarm after a predetermined amount of time to remind the user to obtain a post-meal analyte concentration reading.

[0006] The above summary of the present invention is not intended to represent each embodiment, or every aspect, of the present invention. Additional features and benefits of the present invention are apparent from the detailed description, and figures set forth below.

BRIEF DESCRIPTION OF THE DRAWING

[0007] FIG. 1 is a front side view of a meter having a post-meal test-time alarm feature according to one embodiment of the present invention.

DESCRIPTION OF ILLUSTRATED EMBODIMENTS

[0008] The present invention is directed to a meter that is adapted to determine an analyte concentration in a body fluid sample which is collected with a lancing device. Examples of the types of analytes which may be collected include glucose, lipid profiles (e.g., cholesterol, triglycerides, LDL and HDL), microalbumin, hemoglobin A1C, fructose, lactate, or bilirubin. It is contemplated that other analyte concentrations may also be determined. The analytes may be in, for example, a whole blood sample, a blood serum sample, a blood plasma sample, other body fluids like ISF (interstitial fluid) and urine, and non-body fluids. As used within this application, the term "concentration" refers to an analyte concentration, activity (e.g., enzymes and electrolytes), titers (e.g., antibodies), or any other measure concentration used to measure the desired analyte.

[0009] One embodiment of the present invention is a meter 10 as shown in FIG. 1. The meter 10 has a display 12 that is adapted to display information to a user of the meter 10. Some of the information that may be displayed to a user includes concentration readings, time and date indicators, markers and alarms. The meter 10 also has at least one user input mechanism 15 that is adapted to allow the user to make selections relating to one or more user features. The user input mechanism 15 may include, for example, buttons, scroll bars, touch screens, or any combination of such items. The meter 10 may also have a memory device 17 that is adapted to store concentration readings, etc.

[00010] According to one embodiment of the present invention, the meter 10 includes a post-meal test-time alarm 18. This alarm 18 is adapted to remind a user to test his or her blood glucose concentration after a meal. Preferably, the alarm 18 reminds a user to test his or her blood glucose concentration about 1 ½ to about 2 ½ hours, and most desirably about 2 hours, after a meal. This length of time after a meal has been determined to be the most critical glucose monitoring time since it represents the time frame when blood glucose levels typically spike and can cause the most harm. While some meters provide the capability to program test-time alarms, the present invention automatically ties the alarm to a meal marker and provides for the alarm to go off after a predetermined amount of time. While the remainder of the disclosure herein will be directed towards post-meal test-time alarms associated with glucose meters, it is to be understood that the post-meal test-time alarm may be implemented in meters used for determining other analytes.

[00011] Turning in more detail to FIG. 1, the display 12 shows an analyte concentration reading 16. The reading 16 includes the numerical value and the appropriate units, i.e., 180 mg/dL. The display 12 also shows an icon representing a pre-meal marker 20 and an icon representing a post-meal test-time alarm 22. Also included on the display 12 is a time and date indicator 25. Other markers and/or features may be displayed on the display 12 in addition to the items described above.

[00012] To illustrate the use of the meter 10 and the post-meal test-time alarm 18 according to one embodiment, once a blood glucose concentration reading 16 is obtained, the meter 10 displays certain markers and/or user features. These features may be pre-programmed into the meter 10 before it is used by a user or the meter 10 may be customized for a particular user's needs after use begins. One of the items displayed is the pre-meal marker icon 20. In the example in FIG. 1, the pre-meal marker icon 20 is represented by the shape of an apple. Upon selection of this icon 20 by a user, the meter 10 automatically responds by flashing the post-meal test-time alarm icon 22. In the example in FIG. 1, the post-meal test-time alarm icon 22 is represented by the face of a clock. The user selects the post-meal test-time alarm icon 22 using the user input mechanism 15 to activate the post-meal test-time alarm 18. In addition to the icons described above, i.e., the apple and the clock, it is contemplated that other icons may be used as indicators of the pre-meal marker and the post-meal test-time alarm.

[00013] In some embodiments, the alarm 18 may produce a long beeping sound or shorter successive beeping sounds that occur about 2 to about 3 hours after the pre-meal marker is selected. Ideally, the alarm 18 is sounded about 2 ½ hours after the pre-meal marker is selected based on the assumption that the pre-meal reading is actually taken ½ hour before the meal so that the insulin has time to start working. Thus, a 2 ½ hour delay from the selection of the pre-meal marker activates the post-meal test-time alarm 18 which sounds about 2 hours after the user consumes a meal. If the user does not want to activate the post-meal test-time alarm 18, the user may make other selections via the input mechanism 15 and the post-meal test-time alarm icon 22 disappears from the display 12.

[00014] In addition to the pre-meal marker described above, others markers may be used to activate an alarm that is associated with certain events. Some examples of other markers (not shown) that may be used with the present invention are exercise markers, medication markers, fasting-time markers, log-book markers, and illness markers. The alarm can also be triggered after specific events such as a low or high concentration reading. For example, in one embodiment, an alarm can be triggered one hour after a low concentration reading. In another embodiment, the alarm can be triggered two hours after a high concentration reading. Additionally, the user can set an alarm to be triggered at a specific time each day, such as a noon-time alarm. While the use of the alarm is not tied to a specific event in that case, it reminds the user to take a concentration reading at a particular time each day.

[00015] Some commercially available meters, such as those that are manufactured and/or sold by Bayer Healthcare LLC of Tarrytown, New York, may be redesigned to incorporate the present invention, such as the Ascensia® CONTOUR® Blood Glucose Monitoring System and the Ascensia® BREEZE® Blood Glucose Monitoring System. It is contemplated that other meters, in addition to the ones listed above, may incorporate the present invention as described herein.

[00016] ALTERNATIVE EMBODIMENT A

A meter adapted to determine an analyte concentration reading, the meter comprising a display adapted to display information to a user of the meter, the display including information directed to a post-meal test-time alarm that is adapted to remind the user to obtain a post-meal analyte concentration reading, and at least one user input mechanism adapted to allow the user to activate the post-meal test-time alarm.

[00017] ALTERNATIVE EMBODIMENT B

The meter according to Alternative Embodiment A, further comprising a memory device adapted to store the analyte concentration reading.

[00018] ALTERNATIVE EMBODIMENT C

The meter according to Alternative Embodiment A, wherein the analyte is glucose.

[00019] ALTERNATIVE EMBODIMENT D

The meter according to Alternative Embodiment A, wherein the post-meal test-time alarm is adapted to remind the user to obtain the post-meal analyte concentration reading after a predetermined amount of time.

[00020] ALTERNATIVE EMBODIMENT E

The meter according to Alternative Embodiment D, wherein the post-meal test-time alarm is adapted to remind the user to obtain the post-meal analyte concentration reading about 1 ½ to about 2 ½ hours after a meal.

[00021] ALTERNATIVE EMBODIMENT F

The meter according to Alternative Embodiment E, wherein the post-meal test-time alarm is adapted to remind the user to obtain the post-meal analyte concentration reading about 2 hours after a meal.

[00022] ALTERNATIVE EMBODIMENT G

A method for using a meter adapted to determine an analyte concentration reading, the meter having a display adapted to display information to a user, the method comprising the acts of displaying information relating to a post-meal test-time alarm, activating the post-meal test-time alarm via an input mechanism, and sounding the post-meal test-time alarm after a predetermined amount of time to remind the user to obtain a post-meal analyte concentration reading.

[00023] ALTERNATIVE PROCESS H

The method according to Alternative Process G, further comprising storing the post-meal analyte concentration reading.

[00024] ALTERNATIVE PROCESS I

The method according to Alternative Process G, wherein the analyte is glucose.

[00025] ALTERNATIVE PROCESS J

The method according to Alternative Process G, wherein the sounding of the post-meal test-time alarm occurs about 1 ½ to about 2 ½ hours after a meal.

[00026] ALTERNATIVE PROCESS K

The method according to Alternative Process J, wherein the sounding of the post-meal test-time alarm occurs about two hours after a meal.

[00027] While the invention is susceptible to various modifications and alternative forms, specific embodiments and methods thereof have been shown by way of example in the drawing and are described in detail herein. Specifically, it is contemplated that many other markers may be used with the present invention to activate alarms in the same manner as described herein. It should be understood, however, that the description herein is not intended to limit the invention to the particular forms or methods disclosed, but, to the contrary, the intention is to cover all modifications, equivalents and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

CLAIMS:

1. A meter adapted to determine an analyte concentration reading, the meter comprising a display adapted to display information to a user of the meter, the display including information directed to a post-meal test-time alarm that is adapted to remind the user to obtain a post-meal analyte concentration reading, and at least one user input mechanism adapted to allow the user to activate the post-meal test-time alarm.

2. The meter according to claim 1, further comprising a memory device adapted to store the analyte concentration reading.

3. The meter according to claim 1, wherein the analyte is glucose.

4. The meter according to claim 1, wherein the post-meal test-time alarm is adapted to remind the user to obtain the post-meal analyte concentration reading after a predetermined amount of time.

5. The meter according to claim 4, wherein the post-meal test-time alarm is adapted to remind the user to obtain the post-meal analyte concentration reading about 1 ½ to about 2 ½ hours after a meal.

6. The meter according to claim 5, wherein the post-meal test-time alarm is adapted to remind the user to obtain the post-meal analyte concentration reading about 2 hours after a meal.

7. A method for using a meter adapted to determine an analyte concentration reading, the meter having a display adapted to display information to a user, the method comprising the acts of displaying information relating to a post-meal test-time alarm, activating the post-meal test-time alarm via an input mechanism, and sounding the post-meal test-time alarm after a predetermined amount of time to remind the user to obtain a post-meal analyte concentration reading.

8. The method according to claim 7, further comprising storing the post-meal analyte concentration reading.

9. The method according to claim 7, wherein the analyte is glucose.

10. The method according to claim 7, wherein the sounding of the post-meal test-time alarm occurs about 1 ½ to about 2 ½ hours after a meal.

11. The method according to claim 10, wherein the sounding of the post-meal test-time alarm occurs about two hours after a meal.