PATCH-SIZED FLUID DELIVERY SYSTEMS AND METHODS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 15/911,970, filed Mar. 5, 2018, entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 10,722,643, issued Jul. 28, 2020 (Attorney Docket No. W93), which is a continuation of U.S. patent application Ser. No. 15/082,535, filed Mar. 28, 2016, entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 9,907,903, issued Mar. 6, 2017 (Attorney Docket No. R62), which is a divisional of U.S. patent application Ser. No. 12/395,258, filed Feb. 27, 2009, entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 9,295,780, issued Mar. 29, 2016 (Attorney Docket No. H15), which is a continuation of U.S. patent application Ser. No. 11/704,897, filed on Feb. 9, 2007, and entitled Adhesive and Peripheral Systems and Methods for Medical Devices, now U.S. Pat. No. 8,113,244, issued on Feb. 14, 2012 (Attorney Docket Number 1062/E73), each of which is hereby incorporated herein by reference in its entirety. U.S. Pat. No. 8,113,244 claims priority to the following patent applications, each of which is herein incorporated herein by reference in its entirety:

[0002] Ser. No. 60/772,313, filed Feb. 9, 2006 and entitled Portable Injection System (Attorney Docket No. 1062/E42);

[0003] Ser. No. 60/789,243, filed Apr. 5, 2006, and entitled Method of Volume Measurement for Flow Control (Attorney Docket No. 1062/E53); and

[0004] Ser. No. 60/793,188, filed Apr. 19, 2006, and entitled Portable Injection and Adhesive System (Attorney Docket No. 1062/E46).

[0005] U.S. Pat. No. 9,295,780 is also a continuation of U.S. patent application Ser. No. 11/704,899, filed on Feb. 9, 2007, and entitled Fluid Delivery Systems and Methods, now U.S. Pat. No. 8,414,522, issued on Apr. 9, 2013 (Attorney Docket No. 1062/E70), which claims priority to the following patent applications, each of which is herein incorporated by reference in its entirety:

[0006] Ser. No. 60/772,313, filed Feb. 9, 2006 and entitled Portable Injection System (Attorney Docket No. 1062/E42);

[0007] Ser. No. 60/789,243, filed Apr. 5, 2006, and entitled Method of Volume Measurement for Flow Control (Attorney Docket No. 1062/E53); and

[0008] Ser. No. 60/793,188, filed Apr. 19, 2006, and entitled Portable Injection and Adhesive System (Attorney Docket No. 1062/E46).

[0009] U.S. Pat. No. 9,295,780 is also a continuation of U.S. patent application Ser. No. 11/704,896, filed on Feb. 9, 2007, and entitled Pumping Fluid Delivery Systems and Methods Using Force Application Assembly, now U.S. Pat. No. 8,585,377, issued on Nov. 19, 2013 (Attorney Docket No. 1062/E71), which claims priority to the following patent applications, each of which is herein incorporated by reference in its entirety:

[0010] Ser. No. 60/772,313, filed Feb. 9, 2006 and entitled Portable Injection System (Attorney Docket No. 1062/E42);

[0011] Ser. No. 60/789,243, filed Apr. 5, 2006, and entitled Method of Volume Measurement for Flow Control (Attorney Docket No. 1062/E53); and

[0012] Ser. No. 60/793,188, filed Apr. 19, 2006, and entitled Portable Injection and Adhesive System (Attorney Docket No. 1062/E46).

[0013] U.S. Pat. No. 9,295,780 is also a continuation of U.S. patent application Ser. No. 11/704,886, filed on Feb. 9, 2007, entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 8,545,455, issued on Oct. 1, 2013 (Attorney Docket No. 1062/E72), which claims priority to the following patent applications, each of which is herein incorporated by reference in its entirety:

[0014] Ser. No. 60/772,313, filed Feb. 9, 2006 and entitled Portable Injection System (Attorney Docket No. 1062/E42);

[0015] Ser. No. 60/789,243, filed Apr. 5, 2006, and entitled Method of Volume Measurement for Flow Control (Attorney Docket No. 1062/E53); and

[0016] Ser. No. 60/793,188, filed Apr. 19, 2006, and entitled Portable Injection and Adhesive System (Attorney Docket No. 1062/E46).

[0017] U.S. Pat. No. 9,295,780 may also be related to U.S. Provisional Patent Application No. 60/889,007, filed on Feb. 9, 2007 and entitled Two-Stage Transcutaneous Inserter (Attorney Docket No. 1062/E74).

FIELD OF THE INVENTION

[0018] This application relates generally to patch-sized fluid delivery systems and methods.

BACKGROUND

[0019] Many potentially valuable medicines or compounds, including biologicals, are not orally active due to poor absorption, hepatic metabolism or other pharmacokinetic factors. Additionally, some therapeutic compounds, although they can be orally absorbed, are sometimes required to be administered so often it is difficult for a patient to maintain the desired schedule. In these cases, parenteral delivery is often employed or could be employed.

[0020] Effective parenteral routes of drug delivery, as well as other fluids and compounds, such as subcutaneous injection, intramuscular injection, and intravenous (IV) administration include puncture of the skin with a needle or stylet. Insulin is an example of a therapeutic fluid that is self-injected by millions of diabetic patients. Users of parenterally delivered drugs would benefit from a wearable device that would automatically deliver needed drugs/compounds over a period of time.

[0021] To this end, there have been efforts to design portable devices for the controlled release of therapeutics. Such devices are known to have a reservoir such as a cartridge, syringe, or bag, and to be electronically controlled. These devices suffer from a number of drawbacks including the malfunction rate. Reducing the size, weight and cost of these devices is also an ongoing challenge.

SUMMARY OF THE INVENTION

[0022] In various embodiments of the present invention, a patch-sized housing for a fluid delivery system may include a reusable portion and a disposable portion that is removably engageable with the reusable portion. In terms of fluid delivery management, the disposable portion generally includes all of the fluid management components that come into contact with the fluid (e.g., a fluid path having various valve, pump, and/or dispensing regions bounded by flexible membrane material), while the reusable portion generally