Cartridge based Drug Delivery System

Cartridge based drug delivery systems small and easy to use? This question is discussed in this article by Ludwig Weibel, CEO and Hans Peter Manser, Business Director of Weibel CDS AG. A novel and innovative approach is presented offering patients numerous advantages making their life easier, saving time and avoiding needle stick injuries.

Safer, easier and faster drug delivery – Weibel CDS AG, Switzerland develops and produces innovative, user friendly, application oriented injection systems and devices.

Today’s situation

Currently, the most familiar use of pump systems is for insulin where such systems are widely accepted. Unfortunately, nearly all systems available today require patients to transfer the drug from a vial, for example, into the pump by using a syringe. Self-medication is heavily dependent on the ability of the patients to prepare and manipulate the injection device. This can be a major issue, especially for elderly patients.

Following our mission to support safer, easier and faster preparation and administration of drugs, we have integrated all functions and parts needed for a specific drug application into one product – a cartridge based DRUGDELIVERYSYSTEM. The user only opens one package and the complete handling is done in a closed system in order to reduce contaminations, handling errors and needle stick injuries, combined by a gain of time.

Novelty - Cartridge based DRUGDELIVERYSYSTEM

This system is designed to accept standard 3 ml insulin cartridges. Barely larger than the cartridge itself (Figure 1), the system is extremely small yet still incorporates all functions including a unique pump system, a needle insertion system, a battery, a drive and an electronic control unit.

Figure 1: Small yet incorporating all functions
**Automatic Needle Insertion System**

After a purge function, the automatic needle insertion system is launched inserting the steel needle into the tissue. Immediately the steel needle is retracted leaving a soft cannula assuring highest comfort to the patient. (Figure 2) The mechanism is engineered to make it impossible to launch the mechanism twice as the cannula is in a locked position.

![Figure 2: Automatic needle insertion system with soft cannula remaining in the body after insertion](image)

**Unique Pump System**

Not requiring any type of plunger rod, the system is designed to suck out the drug instead of pushing it out. This demands a pump system being extremely powerful to overcome the break-loose forces and to allow the rubber stopper to glide smoothly during injection. Nevertheless, for basal and bolus injections the pump is required to accurately provide the required dose. (Figure 3) Still the system offers pharma companies full flexibility in setting the doses as required, up to a maximum dose. There are no limits such as stroke volume limiting individual doses.

![Figure 3: Accurate dosing assured by the unique pump system](image)

**DRUG DELIVERY SYSTEM** of Weibel CDS AG – ready to use, and no longer require the patient to transfer the drug into the system.
Freedom of Choice

The cartridge may be pre-assembled by the pharmaceutical company using their specific cartridge which can hold less than 3ml or alternatively a solution is available offering the patient to choose the insulin supplier by himself. (Figure 4)

Figure 4: Available for all 3ml cartridges

The device is patched to the body - often the abdomen and may be operated via an external control unit allowing the patient an intimate use.

Electronic Control Unit

The software used to control the DRUGDELIVERYSYSTEM offers highest degree of flexibility. Various levels of access guarantee for its proper use. The pharma company can set the overall limits relative to the drug administered, doctors or health care personal can define the patient’s specific settings and the patient can, for example, set a bolus as required by his diet. (Figure 5)

Figure 5: External Control Unit

The external control unit maybe combined with a glucose monitoring system

Once the cartridge is empty, the patient receives an alert requesting a change of the disposable part including a new, full cartridge. The battery of the reusable part can be reloaded. One battery load is supporting a minimum three to five-day operation of the device.

Watch the system in operation under:

http://www.weibelc_ds.com/wp-content/themes/cdsweibelag/videos/weibel_dds.ogv
**DRUG DELIVERY SYSTEM**

Full integration of all functions and parts

The advantage for the end user is a reduction of

- contaminations
- handling errors
- needle stick injuries

and a gain of time

Pharma companies can differentiate themselves from competition. The final design is according to your specific needs from a functional as well as design perspective.

**Portfolio**

Besides the Cartridge based **DRUG DELIVERY SYSTEM**, Weibel CDS AG offers:

**LVDs** (Large Volume **DRUG DELIVERY SYSTEM**) based on our MiniBagSystem concept for micro infusion of up to 30 or even 50ml.

**DRUG DELIVERY SYSTEM** 1ml long syringe based. Automatic injection of 1ml long syringes over a period or at a specified time.

**DRUG DELIVERY SYSTEM** with automatic reconstitution functionality.

**Squeezer** Test and Application System for stability testing of drugs in the MiniBagSystem.

*International patents pending.*

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