

A novel infusion system (PatchPump®) has been developed using an electrochemical actuator and a semi-flexible container to deliver liquid formulations through an infusion set” Shaked et al (2015).

Abstract:

PURPOSE: A novel infusion system (PatchPump®) has been developed using an electrochemical actuator and a semi-flexible container to deliver liquid formulations through an infusion set. In vitro studies characterized pump performance, and clinical studies evaluated functionality and pharmacokinetic (PK) performance in humans.

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METHODS: Total delivered volume and flow rate accuracy were determined in vitro by real-time gravimetric analysis. Functionality was evaluated in vivo using prototype devices delivering saline for 18 h in a clinical study enrolling 10 healthy volunteers. A second clinical study examined the PK of delivering treprostinil at an average dose of 2.3 ng/kg/min to 5 healthy volunteers for 18 h.

RESULTS: Relative to a design target of 0.042 mL/hr, the average flow rate of 23 PatchPumps operating for 48 continuous hours was 0.043 ± 0.007 mL/hr as tested in vitro. In vivo functionality was confirmed by complete infusion of saline for the entire duration with only mild and transient adverse effects. PK results with an infusion rate of 0.045 mL/hr of treprostinil resulted in mean C_{ss} of 297 pg/mL and $T_{1/2}$ of 4.44 h, comparable to prior studies using conventional infusion pumps.

Reference:

Shaked, A., Tenenbaum-Koren, E., Atsmon, J. and Noymer, P. (2015) In Vitro and In Vivo Performance of a Pre-Filled, Electrochemically-Actuated Infusion System. Pharmaceutical Research. July 29th. .

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