IMS - Continuous Glucose Monitoring Reinvented

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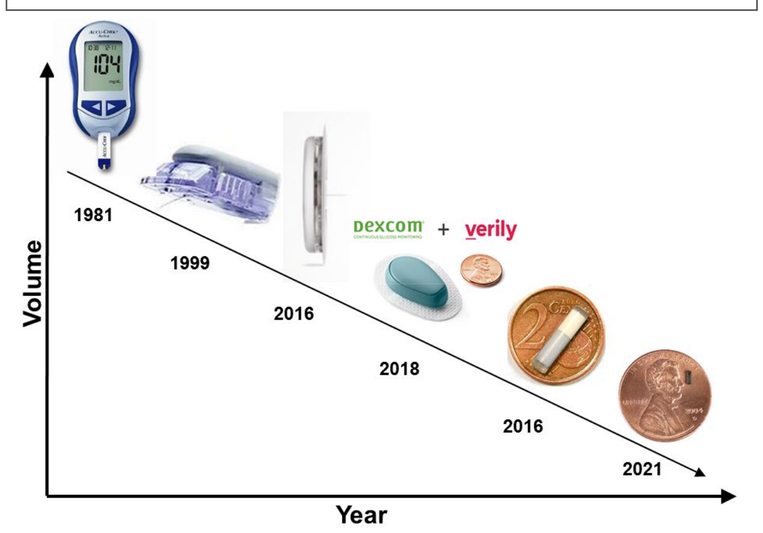
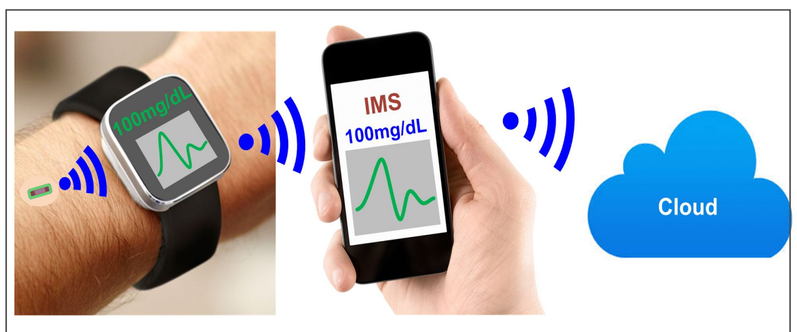
Integrated Medical Sensors (IMS) Inc. has developed a revolutionary, patent protected, fully integrated wireless, batteryless, implant that is embedded under the skin and monitors glucose in the interstitial fluid via a wearable wireless transmitter and smart reader [1].



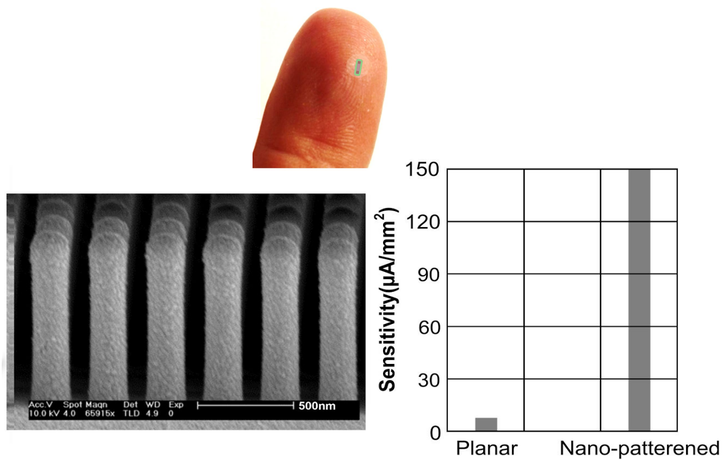
Evolution of Personal Glucose Monitors

The IMS system simplifies user experience by providing wireless operation, reducing cost, increasing lifetime and not requiring any patient input beyond the initial implantation and occasional (1x/week) calibration. The implant is produced using standard consumer electronics fabrication process [2]. This drives down cost as well as size of the device by 10x.



Components of IMS Wireless Glucose Sensing Platform

The patient wears a transmitter on the implant site. The transmitter powers the device and communicates with it wirelessly same way an RFID card reader powers and communicates with an RFID card. The transmitter automatically logs sensor readings, displays them, and sends the data to patient's smartphone via Bluetooth. The smartphone then transmits the data and trends to healthcare professionals, caretakers, and those who can assist the patient. The sensor uses nanotechnology to provide unprecedented performance [3].

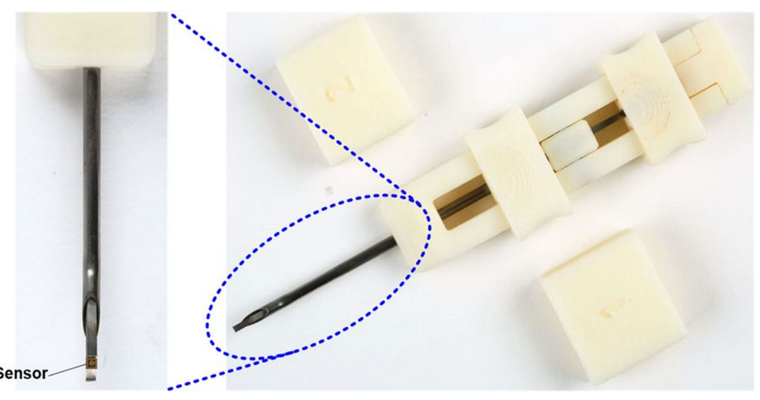


Nanotechnology enhanced performance of IMS Glucose Sensor

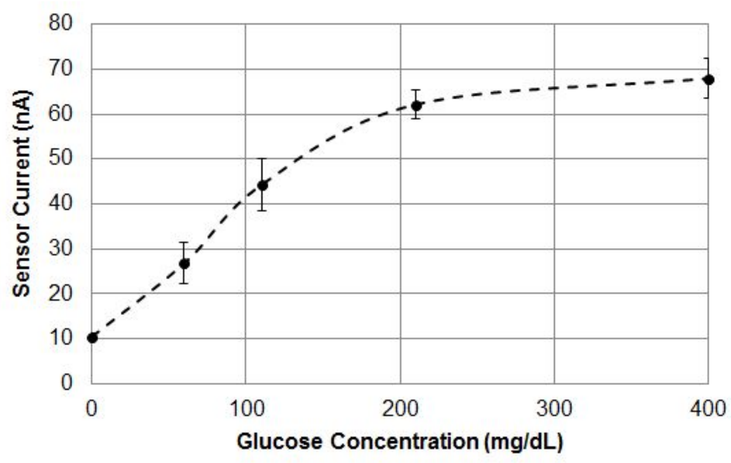
The sensor utilizes nanotechnology to provide unprecedented performance [3].

~ $ 1/day

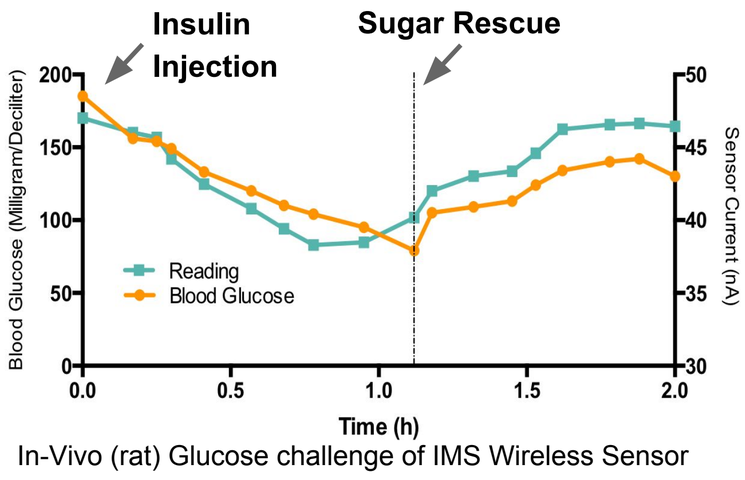
User experience with IMS wireless glucose sensing platform



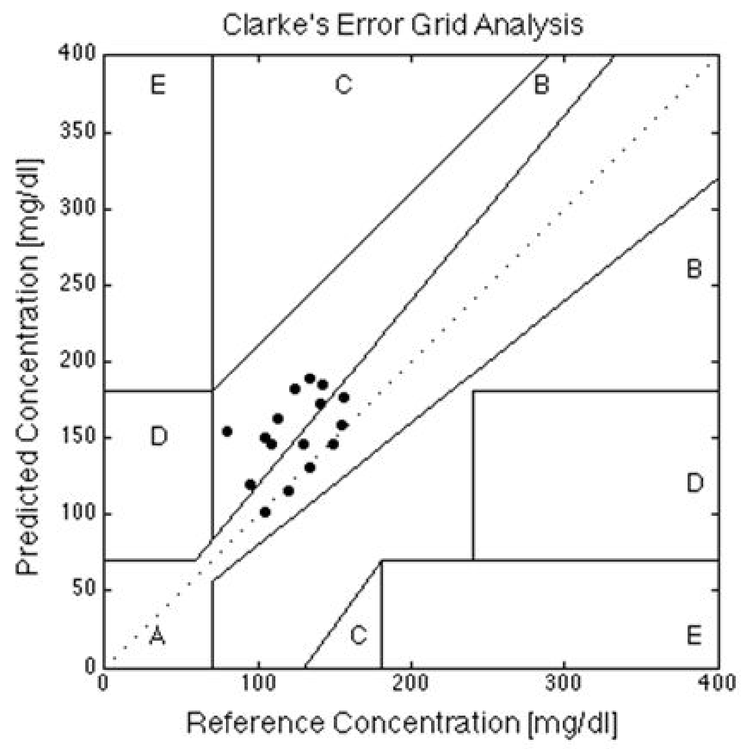
Sensor Insertion using IMS applicator



In-Vitro response of IMS Sensor over 30 days



In-Vivo (rat) Glucose challenge of IMS Wireless Sensor



Statistical Performance of IMS Sensor In-Vivo

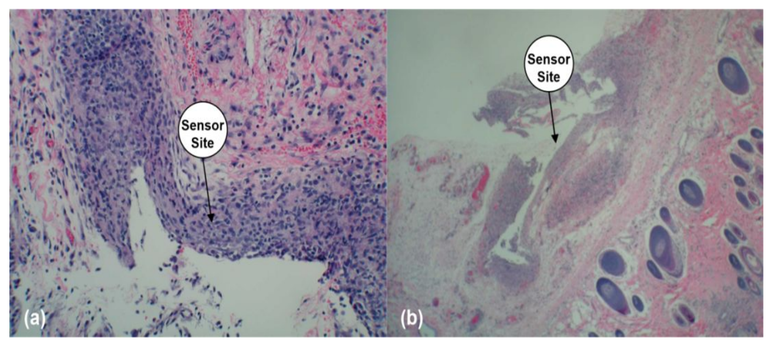
IMS minimizes cost and development risk by building upon proven technology:

-Enzymatic amperometry with glucose oxidase (GOx) is gold-standard in glucose monitoring implants for safety and function.

-Complementary Metal Oxide Semiconductor (CMOS) Manufacturing technology produces nearly every single computer chip including our device.

-RFID technology provides efficient , FDA approved wireless solution for implants.

IMS has shown the safety and viability of the implant both in-vitro and in-vivo.



Histology analysis of the implant site, (a) mild inflammatory response, (b) minimal to mild amount of collagen fibers present in the fibrovascular wall of the implant

The small size of the device not only allows patients to implant it through an applicator but also reduces any encapsulation around the implant; this increases sensor lifetime and decreases calibration needs [4].

We have proven wireless glucose sensing in animal models (rats) and are working to get approval for human testing.

- **Over 1 year In-Vitro stable lifetime**
- **Sensitive over clinical glucose range (40-400mg/dl)**
- **In-Vitro MARD of better than 5% ***
- **High sensitivity in hypoglycemia (detect ~ 10mg/dl)**

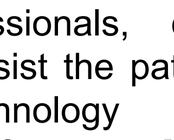
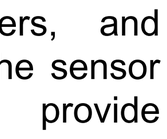
References

[1] M. Mujeeb-U-Rahman, M. Honarvar Nazari, M. Sencan, A. Scherer, "Design and fabrication of implantable fully integrated electrochemical sensors," US patent 20140336485 A1.

[2] M. Mujeeb-U-Rahman, A. Scherer, "Fabrication of three-dimensional high surface area electrodes ," US Patent 9,006,014, 2015.

[3] M. Honarvar Nazari, M. Mujeeb-U-Rahman, A. Scherer, "An implantable continuous glucose monitoring microsystem in 0.18μm CMOS," IEEE VLSI Symposium, June 2014.

[4] Meisam Honarvar Nazari, Muhammad Mujeeb-U-Rahman, Mehmet Sencan, "Wireless Electrochemical Sensing Platform For Multi-Analyte Sensing", US Provisional patent 079280-089770P

Product	G5 Platinum	Guardian	FreeStyle Libre	Eversense	IMS
Sensor					
Insertion	Applicator	Applicator	Applicator	Needle-Insertion	Needle- Insertion
Sensor Life	7 days	7 days	10-14 days	90-180 days	90-180 days
Calibration	2x/day	2x/day	No	2x/day	No
Alarms	Yes	Yes	No	Yes	No
Annual Cost	> $4800	> $4800	> $2000	NA	~$1000
Transmitter	Skin Patch	Skin Patch	Skin Patch	Skin Patch	Wearable
Receiver	Hand-held/ Smartphone	Hand-held	Hand-held	Smartphone	Smartphone
MARD	9%	10.55%	11.4%	8.8%	12.6% (9% Target)
MRI Safe?	No	No	No	No	Yes