

## Hot pick of the month

# Blind patients see the light with retinal implant system from Switzerland's IMI

## INTELLIGENT MEDICAL IMPLANTS

**Specialty area(s):** Retinal diseases  
**Based in:** Zug, Switzerland  
**Founded in:** 2002  
**No. of employees:** 26  
**Total investment received to date:** €30m (\$44m)  
from Abingworth, Global Life Science Ventures, PolyTechnos Venture Partners and Quantum Technology Partners

With retinal diseases being notoriously difficult to treat, going blind is a fate that awaits most patients suffering from conditions such as age-related macular degeneration and retinitis pigmentosa. However, much research has been going on within academic and commercial organisations to come up with a device that would allow these patients to regain some of their sight and improve their quality of life.

One such company is Intelligent Medical Implants, which has developed an "intelligent retinal implant system" that acts as an artificial retina, carrying out the information processing function that was lost following the degeneration of the natural retina.

The system consists of three components. Firstly, there is the retinal implant itself, made up of an infrared (IR) signal receiver and a 49-electrode array, which is attached to the macula, near the ganglion cells. Secondly, there are two external components: a pair of specially-designed glasses with a built-in camera

joined by a cable to a pocket processor.

When the camera captures an image, this information is sent to the pocket processor. This processes the data and translates it into electrical signals, which are then sent back to the glasses and transmitted via infrared to the implanted receiver. The signals stimulate the electrode array at the back of the eye to emit electrical pulses, which induce a response in the retina.

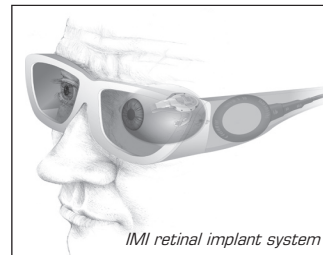
According to Andrew Moore, managing director of IMI, one of the advantages of the retinal implant is that the surgical procedures are already known and practised. "The receiver is implanted in a similar way to a glaucoma shunt, while the electrode array is attached, using retinal tacks – a device that was once commonly used to treat detached retinas," he tells *Medtech Ventures*.

Another benefit of the retinal implant design is that it is removable – an important point from a regulatory as well as commercial standpoint. Not only will a removable implant have a smoother regulatory pathway because of the safety aspect, it can also boost revenues by allowing the option of future upgrades, says Mr Moore.

As to the quality of vision offered by the retinal implant system, early studies have shown that patients were able to see light and distinguish shapes and patterns. While IMI's system may not offer

20/20 vision, Mr Moore believes it makes a significant difference to the patient's quality of life.

"These patients normally see nothing at all. By allowing them to move around the house, pick up things that they see, the system can give them back some of the independence that they have lost," he tells *Medtech Ventures*.



He adds that over time, the visual resolution will improve as the technology continues to evolve – like in the case with cochlear implants: "When the cochlear implant first came out, it was very rudimentary with only a couple of electrodes. Now it has 22 electrodes, and even babies are implanted with the device."

IMI's closest competitor is Second Sight Medical Products. Founded in 1998, Second Sight already has two FDA-approved investigational device studies underway – one being on the company's second-generation epiretinal implant. The US firm's technology was originally based on that used in cochlear implants, whereby the receiver of

the first-generation Argus was implanted behind the ear. Second Sight's second-generation system has the receiver implanted in the eye, as with IMI's technology. In addition, it boasts a 60-electrode array, which the Sylmar, California firm claims is the highest electrode count for any retinal implant in the world.

Mr Moore sees the positive side of its rival having a slight headstart in its clinical programme. "Second Sight has laid out the regulatory groundwork for us and marked out the route we have to go to get to that stage in the US," he says. Nor does he see IMI as trailing behind its competitor. "Looking at the stage of development of the two competing technologies, Second Sight will probably be the first to have a product in US, but IMI will probably be the first in Europe," says Mr Moore.

IMI has begun pilot trials of its system in six centres across Europe. It anticipates completing clinical trials during 2009, with a CE mark to follow shortly in 2010. The company will be looking to raise more funds in early 2009 to take the product through commercialisation and to the US.

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