



Revolutionary Sight Restoration

Industry

Medical Devices –
Ophthalmology

The product

Bio-Retina - Functional
Level Artificial Retina

Core Competence

Ultra-Low-Power ASIC
Miniaturized Mechanics
Neuron Stimulation
Wireless Energy Transfer

Year Founded – 2009

Addressable Market

More than \$1B annually

Management Team

Efi Cohen Arazi, Chairman
Ra’anan Gefen, Managing
Director

Nano Retina Inc.

8 Mascit Street, POB 4100,
Herzeliya Pituach, 46140,
Israel

www.nano-retina.com

Restoring eyesight to the blind has, until now, mainly been the province of science fiction, exemplified by futuristic devices featured in popular movies and TV shows such as The Six Million Dollar Man and Star Trek.

Nano Retina's objective is to make sight restoration a reality.

Age-related macular degeneration (AMD), cataracts, glaucoma and diabetic retinopathy are among the causes of degenerative blindness. According to the National Federation of the Blind, 50,000 people in the United States go blind annually. In addition, there are currently 3.6 million Americans aged 40 and older who are legally blind; this number will rise as baby boomers continue to age.

Fast Forward to the Future: Nano Retina’s Bio-Retina

Nano Retina, a joint venture of Zyvex Labs (www.zyvexlabs.com), and Rainbow Medical (www.rainbowmedical.co.il), is developing Bio-Retina, a bionic retina designed to restore sight to those suffering from retinal degenerative diseases. Bio-Retina incorporates various nano-size components in one tiny, flat implant, approximating the size of a child’s fingernail bed. Its simple 30-minute implant procedure requires local anesthesia, a small incision and “gluing” of the device to the damaged retina. Return of sight is anticipated to be instantaneous: 24x24 with the first generation and 72x72 with the second generation product (see illustrative pictures below), enabling persons who have undergone the procedure to watch TV and identify faces. Recovery time is estimated at up to one week.

COMPETITORS

**Ambulatory
Vision -
Follow line**

Nano Retina

**Visual
recognition -
Watch TV**


4x4


10x10


16x16


24x24


36x36


72x72

How Bio-Retina Works

Bio-Retina is designed to replace the damaged photoreceptor in the eye with the equivalent of a 600 pixel (first generation) or 5,000 pixel (second generation) retinal implant. Bio-Retina transforms naturally received light into an electrical signal that stimulates the neurons, which send the pictures received by Bio-Retina to the brain. Bio-Retina works harmoniously with the natural functionalities of the eye, including pupil dilation and eyeball movement. Patients will be able to look from side to side with their eyes rather than needing to turn their heads, as required by competing technologies. A rechargeable, battery-powered mini laser, situated on a pair of eyeglasses, efficiently powers the implant wirelessly.

Development, Market Launch and Market Projections

During 2011, Nano Retina created a “nano” prototype validating the miniaturization technologies needed to produce the Bio-Retina. This prototype met all specifications during *in vitro* and *in vivo* testing.

In the next phase, which has already begun, the implant, fully functional in its actual size and ready for implantation, will be manufactured. Thereafter, the company plans to conduct preclinical and clinical trials, the latter likely to commence in 2013.

Following clinical trials, Nano Retina intends to pursue an accelerated route to market. Expectations for success are high: technological and medical experts agree that development and clinical goals are attainable.

By a conservative estimate, the addressable retinal prosthesis market will reach 180,000 units annually by 2015. With a \$60K target price for Bio-Retina, Nano Retina expects to achieve annual sales of more than \$1 Billion.

The Talent Behind the Technology

Nano Retina was founded by Yossi Gross and Jim R. Von Ehr, who serve as company directors; Efi Cohen-Arazi, the company's chairman; and Ra'anan Gefen, the company's managing director. All are industry experts in their respective fields:

Yossi Gross, a medical device industry visionary, has filed more than 500 U.S. patents and founded and co-founded more than 27 medical device companies. He is a co-founder of Rainbow Medical, which seeds and grows Israel's most promising medical device companies, which build upon his inventions.

Jim Von Ehr, an icon of the nanotechnology industry, is the founder and current chairman of Zyvex Performance Materials and Zyvex Labs, leading nanotechnology developers. Von Ehr played a leading role in the establishment of the University of Texas NanoTech Institute and the founding of the Texas Nanotechnology Initiative. The recipient of many prestigious awards for his nanotechnology leadership, he is also a member of the Nanotechnology Technical Advisory Group (NTAG) to the U.S. President's Council of Advisors on Science and Technology (PCAST).

Efi Cohen-Arazi is a veteran of the biotechnology and medical device industries. Prior to Rainbow Medical, he served as CEO of Intec Pharma, Israel, as well as VP corporate manufacturing of Amgen Corporation in California. Cohen-Arazi also held senior positions at Immunex in the U.S. and Merck-Serono in Switzerland.

Ra'anán Gefen is a Talpiot graduate, a technological leadership program of the IDF. He is well known in both the defense and medical industries for his expertise in developing and managing R&D projects, based on a system engineering approach. Before joining Nano Retina, Gefen served as EVP and acting CEO at GI View Ltd. and as CTO at Vascular Dynamics Ltd.

Finance

Nano Retina investors include Rainbow Medical Ltd., Zyvex Labs LLC and DOCOR International BV. In addition Nano Retina has received additional non-dilutive funding for specific projects from the BIRD (Binational Industrial R&D) Foundation and the Seventh Framework Program (FP7) of the EU.

The Competition

In recent years, less than half a dozen efforts, funded by government grants (U.S., German, Australian, Japanese and Korean) and private capital, have been made to restore some measure of sight to the blind. Systems currently being researched require general anesthesia and a six-hour operation to implant surgically, construct and connect multiple pieces of hardware in the eye, or alternatively, to insert surgically an implant into the eye which is connected to a wire passing through the patient's skull. Patients wear eyeglasses with an external camera and transmitter as well as a belt with a video processor and battery that charges the system. The patient is able to see forward, but must move the head to change the field of view. These systems provide up to 60 pixels of sight capacity (less than 10x10 as illustrated in the picture above), i.e. a patient can differentiate between dark and light and perhaps identify the existence of an object. The first of these systems, Argus II of Second Sight, is selling in Europe for more than \$100K.

Against this background, it is clear to see the many advantages of Bio-Retina in terms of deliverables, cost and return on investment.

Contact

To schedule a full product briefing, please contact Ra'anán Gefen, Managing Director, Nano Retina: gefen@nano-retina.com