

# ISRAEL HIGH-TECH & INVESTMENT REPORT

A MONTHLY REPORT COVERING NEWS AND INVESTMENT OPPORTUNITIES  
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## We are celebrating 20 years of publishing

Towards the end of the year there is solid evidence to indicate that the Israeli high-tech is heading for its best year since 2000. The word Internet has lost its once tarnished image and Internet IPO's are well received by the investment public. Perhaps part of the credit goes to Sergey Brin and Larry Page who in 1998 founded the popular search engine Google while they were graduate students at Stanford University. From the outset the company's mission was to organize the immense, seemingly infinite amount of information available on the web. Google's features and performance attracted new users at an astounding rate.

Google filed with the U.S. Securities and Exchange Commission to raise as much as \$2.7 billion through an initial public offering of stock. In an unexpected move, Google sold all of its stock through an Internet-based public auction process, bypassing the traditional Wall Street route that critics say favors insiders and institutional investors over individuals. The price of the offering was modest and in the first six months the enthusiasm of the public for Google shares resulted in the doubling of the IPO price. Google has solid earnings, and the expectations for fast growth appear to be on target.

For the first time in nearly five years, Initial Public Offerings are beginning to bloom. Power over Ethernet company, PowerDsine, made its initial public offering on Nasdaq. The IPO was the first by an Israeli company in New York in 2004. The company raised a total of \$58.65 million, at a valuation of \$250 million. Investors traded the shares at a premium over the issue price. On its first day of trading on the Nasdaq exchange, Shopping.com's share price leaped more than 50%, reflecting a company value of \$750 million.

Underlying the IPO activities were reports that Israel's VC industry was investing more, as well as raising new capital. In Q3 2004 nearly \$450m. was raised by Israeli companies from venture capital funds. The activity was accompanied by sounds of renewed confidence and reports that the local VC companies were beginning to attract substantial funds from foreign investors.

Universities are increasing their activities in nanotechnology and other fields.

A case in point is Ben Gurion University of the Negev whose president Prof. Avishai Braverman recently announced that a number of international business people, led by Swiss Jewish banker Edgar D. de Picciotto, chairman of Union Banque Privée, will establish a \$500 million investment fund for the Negev.

Braverman said that the fund would be conditional upon

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Delek Automotive Best TASE Performer of Past Decade  
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Getting Bones Together

matching complementary Governmental investment plan, modeled on the Irish example, with focus on granting tax exemptions over a 10-year period.

Prof. Braverman made the announcement at a recent Ben Gurion University conference, entitled, "Biotechnology: From basic research to Application". Leading Israeli and international biotechnology researchers were in attendance, including Nobel Prize Laureates, Prof. Aaron Ciechanover and Prof. Sir Aaron Klug of Cambridge University; Prof. Raymond Dwek, head of the Department of Biochemistry at Oxford University. The University impresses with its ability to gain financial backing and to attract outstanding scholars and scientists.

Additional bullish indications, such as the increased demand for technical personnel was accompanied by rising wages.

Moreover, optimistic investors on the Tel-Aviv Stock Exchange have pushed up prices of shares to new 2004 highs

External factors may also contribute to a "good" 2005.

The recent death of Yasir Arafat removes, to some extent, sponsored terrorism. Any new government that the Palestinians will elect is unlikely to openly supply funds to Hamas, Fatah and other terrorist factions.

Barring totally unforeseen events, we feel that 2005 will be by far, the best year since the end of the turbulent 1990s.

## Nanotubes Form Along Atomic Steps

The Weizmann Institute of Science announced that a research group headed by Dr. Ernesto Joselevich has developed a new approach to create patterns of carbon nanotubes by formation along atomic steps on sapphire surfaces. Carbon Nanotubes -- tiny tubes about 10,000 times thinner than a human hair -- consist of rolled up sheets of carbon hexagons. Discovered in 1991 by researchers at NEC, they have the potential for use as minuscule wires or in ultrasmall electronic devices. To build those devices, scientists must be able to manipulate the Nanotubes in a controlled way. Carbon nanotubes are excellent candidates for the production of nanoelectronic circuits, but their assembly into ordered arrays remains a major obstacle toward this application.

The team was initially researching in a different direction: they were trying to give carbon nanotubes (structures reminiscent of rolled-up sheets of graphite) a preferred orientation on a wafer by applying an electrical field as the tubes were being formed. This works very well with silicon dioxide

wafers.

Closer examination of the sapphire surface solved the mystery: commercial sapphire wafers are generally not cut exactly along the plane of the crystal. Their surface is thus not completely smooth; instead, it has parallel steps -- of atomic dimensions -- between the different planes of the crystal. The nanotubes wind up lying along these steps. The researchers explain it like this: the nanotubes form from a catalyst of iron nanoparticles and are attracted to a local field created by the steps. It is clear that these iron particles don't like "climbing stairs;" instead, they "glide" along the inner edge of the step, like on a track. They thus remain continuously in contact with two surfaces, rather than just one, which seems to stabilize the catalyst. Just as an airplane leaves behind a condensation trail, the iron particles leave the newly formed nanotubes lying along their "tracks." The nanotubes even follow kinks in the steps, which are caused by defects in the crystal. This results in either straight or zigzag-shaped tubes, which are expected to have particularly interesting electron properties.

"The orientation and form of the atomic steps on a crystal surface can be controlled by the cutting process, and defects can be created artificially," says Joselevich. "It should thus be possible to produce different nanowire arrangements in a controlled fashion."

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## Ness Technologies wins Reuters Contract

Ness Technologies, Inc. (NASDAQ: NSTC), a provider of IT solutions and services, announced that it has been awarded a 5-year outsourcing contract from Reuters Israel valued at more than \$1 million. Ness Technologies was chosen over HP, IBM and MALAM in competitive bidding.

Ness Technologies will provide Reuters Israel with ongoing support and maintenance services of Reuters' IT and communications infrastructure, as well as on-site support of the dealing rooms of banks and financial customers to whom Reuters provides information services and technological products. As part of the tender process, representatives from abroad arrived in Israel to get a first-hand look at Ness Technologies' capabilities, due to the critical service demanded from the outsourcing vendor. The financial service is critical because it is a core business of Reuters' banking and financial customers, and the systems must be fail-safe.

This year Ness Technologies has established its position as the leading company in the Israeli outsourcing industry and has won most of the outsourcing projects in Israel. This was confirmed by a recent published study by IDC Israel. Major outsourcing projects won by Ness include YES – Israel's satellite television broadcaster; the Industrial Development Bank of Israel; Migdal Insurance Company; ISTA travel and tourism company; Hagichon – the Jerusalem Municipality's water and wastewater corporation; Tadiran Systems; Sano; Rav-Bariach; the Academic College of Tel Aviv-Jaffa; Sheba Hospital, Mul-T-Lock; ORT; Partner Communications; Applied Materials; insurance agencies; pension funds; government ministries and others.

Ness provides services to more than 500 clients in commercial, industrial, and government sectors worldwide, including Fortune 1000 and global 2000 companies. Ness' proven record of success extends to more than a dozen key vertical markets, notably government, defense, financial services, life sciences, healthcare, telecommunications, utilities, and the independent software vendor (ISV) marketplace.

Ness Technologies employs 4,900 people. The company has operations in 14 countries including: the US, the UK, Switzerland, the Netherlands, Germany, Canada, Israel, India, the Czech Republic, the Slovak Republic, Singapore, Malaysia, Japan and Thailand.

## FDA Approval for Orthocrat

Orthocrat, an Israeli medical technology firm announced that it had obtained United States Federal Food and Drug

Administration clearance to market its system.

TraumaCad is a system of digital orthopedic planning software, provides surgeons with digital images, tools and templates allowing them to plan the surgical treatment. A digital X-ray of the patient appears on the screen, enabling the surgeon to carry out digital manipulations to plan his intervention. The images can be screened in the operating room.

The company was established in 2003 by surgeons Zeev Glzman, Miron Liram, and Doron Norman

Since Orthocrat began selling its products in April of this year, its sales have passed half a million dollars in revenues. The company expects to double that figure in 2005. The company is integrating the Israeli firm's surgical preplanning software with PACS – public access computer systems – of medical files.

## Arotech Selling Armored Cars in Iraq

Arotech Corporation (Nasdaq:ARTX) announced that its vehicle-armoring subsidiary MDT received a \$4 million contract.

MDT will be armoring the vehicles at its Auburn, Alabama facility, for delivery to forces in Iraq.

"Demand for our armored vehicles continues to be strong and our U.S. plant is well-established to support this growing demand," stated Robert Ehrlich, Arotech chairman and CEO.

MDT provides advanced lightweight armoring for vehicles, protecting them against extreme conditions including assault rifles and bomb blasts.

Its range covers SUV's such as the Toyota Land Cruiser, the Land Rover Defender and the GM Suburban; vans and buses - from an 8 passenger Ford Econoline to a 16 passenger Mercedes bus; ambulances and other specialty vehicles.

## WideMed Raises \$3.8m

Israeli biotechnology start-up WideMed Ltd. has raised \$3.8 million in its first financing round. A \$1.3 million investment by Ascend Technology Ventures completed the round, joining investments by Platinum Neurone Ventures, Leader Tech (TASE:LDRTC), Danbar Technologies, Guidant Corporation (NYSE:GDT). President and CEO Amir Geva, formerly at M-Systems, and Aryeh Mergi, a director in WideMed.

WideMed develops and commercializes biomedical signal

processing technologies for reliable clinical interpretation and advanced diagnosis and prognosis in clinical and remote settings. In other words, patients do not need to be hospitalized for diagnosis and treatment. WideMed's platform provides direct interaction with patients, and real-time diagnoses and treatments.

WideMed's first application selected for marketing is a device for diagnosing sleep disorders, which the US Food and Drug Administration (FDA) approved for marketing 18 months ago.

### **BioLineRx Awarded \$21m. OCS Grant**

The Office of the Chief Scientist announced its selection of BioLineRx as the recipient of a \$21 million grant for the development of pre-clinical compounds.

The grant increases BioLineRx's total available funds for development to over \$35 million. BioLineRx plans to use the additional funding to expand its development capabilities including building a laboratory for pre-clinical experimentation at its headquarters in Jerusalem.

Since its founding in 2003, BioLineRx has screened over 300 potential projects for entry into its drug development pipeline, has identified a number of high potential candidates for further development, and is already developing BL-1020, a novel small molecule for the treatment of schizophrenia.

The Ministry of Industry, Trade and Labor's biotech initiative is designed to encourage the further development of innovative projects from Israeli universities, hospitals, research centers and early stage companies.

### **Anti-missile Technology**

Elisra's Lorica detects and tracks missiles using sophisticated algorithms, as well as image and signal processing. It tracks each missile's trajectory to determine whether or not it directly threatens the aircraft. If the system determines the missile is a threat, it alerts the pilot and automatically deploys countermeasures to direct the missile away from the aircraft.

The company's recommended countermeasures package for the civil market is the directional infrared system developed by fellow Israeli groups Rafael and Elbit.

This system uses a laser beam to jam the missile's guidance system. In military applications, chaff and flare dispensers are commonly applied countermeasures, but aviation authorities have questioned whether these are safe for use around civil airports.

### **Laser Zaps Bad Breath**

Scientific American in a recent issue featured a laser treatment for one of the worst forms of halitosis, a rarely diagnosed version that wafts relentlessly from the tonsils.

Mild halitosis usually results from anaerobic bacteria breeding in shallow cavities in the gums or teeth. The bugs release foul-smelling gases such as hydrogen sulphide. Routine dental treatment, regular brushing and mouthwashes usually solve this problem.

But there are more persistent cases and Yehuda Finkelstein of the Meir Hospital at the Sapir Medical Center in Kfar Saba, Israel, has found that the tonsils are often to blame.

Tonsils have deep airless crypts and grooves that make perfect breeding grounds for anaerobic bacteria. "It's the ideal place for them," he says.

Finkelstein has successfully treated the condition using a laser procedure lasting just 15 minutes. The laser vaporizes infected tissue and seals the crypts by creating scar tissue that bacteria cannot colonise. More than half of a group of 53 patients were cured in one session, while the others were cured after either two or three treatments.

Richard Price, a consumer adviser to the American Dental Association, says that the procedure could be useful as a last resort, but that tonsils only cause up to 6% of halitosis cases. "Try conventional treatment first," he says. "Scraping the tongue and using mouthwash seems to work for most people."

### **Hebrew U. Scientist finds 'Sweet' Way to Help Prevent Heart Disease**

People who eat the Israeli developed fruit known in Hebrew as pomelit (a cross between a grapefruit and a pomelo) or drink its juice regularly will be able to lower their blood cholesterol and increase their blood antioxidant activity, thus improving their chances of preventing blocked heart arteries and heart attacks, says a researcher at the Hebrew University of Jerusalem.

These findings were recently published by Dr. Shela Gorinstein of the Department of Medicinal Chemistry and Natural Products at the Hebrew University of Jerusalem School of Pharmacy in the Journal of Agricultural and Food Chemistry.

In order to test the benefits of drinking the juice of the pomelit

(known commercially as Israeli Jaffa Sweetie), 72 patients at Kaplan Hospital in Rehovot who were suffering from hypercholesterolemia (elevated cholesterol levels) and had undergone bypass surgery were given daily supplements of Sweetie juice for 30 days. The patients, who ranged in age from 43 to 71, were divided into three groups of 24 each. One group received a daily supplement of 100 milliliters of the juice; a second received 200 milliliters; and a third – the control group – received none.

The results showed definite lowering of LDL (“bad”) blood cholesterol and an increase in blood antioxidant activity in patients from the two groups who drank the juice as opposed to those who did not. The patients who consumed the highest daily supplement of juice showed a significant increase in blood albumin and decrease in blood fibrinogen levels, which enhance anticoagulant activity. These positive changes could prevent heart diseases.

The clinical investigation took place at Kaplan Hospital in Rehovot and was carried out by a team headed by Prof. Abraham Caspi, head of the Cardiovascular Institute there, in cooperation with other research groups at various universities in Japan, South Korea, Germany, the Czech Republic and Poland that ran similar tests. Positive results were obtained by all of the various research groups.

The researchers concluded their findings with a recommendation that hypercholesterolic patients add fresh Sweetie juice to their daily diets as a likely beneficial preventative to future heart disease. The juice also can serve as a preventative for those who have had no symptoms of arterial occlusion or heart problems but would like to benefit from the prophylactic benefits of this fruit.

### **UltraShape Raises \$6.0m.**

UltraShape, a developer of non-invasive medical devices for reducing weight, has raised \$6 million from Israel Seed Partners.

UltraShape’s device uses ultrasound to cavitate body fat. It is designed to provide an alternative to liposuction surgery. The company says that the global market totals \$4.4 billion, divided evenly between the US, Europe, and the rest of the world. Liposuction is considered fairly hazardous, since lung tissue and blood can be suctioned out together with fat. UltraShape says that liposuction is the most commonly used esthetic procedure performed in Western countries, particularly in the US, although it causes the death of 20 out of each 100,000 patients undergoing the treatment.

UltraShape has already conducted clinical trials on hundreds of women in the US, Japan, and Britain. The company, which has 34 employees, believes that the money it has raised will last until the end of 2005. Meanwhile, UltraShape hopes to obtain European CE Mark Certification in the second quarter of 2005, as well as US Food and Drug Administration (FDA) approval.

### **Reliance Considering R&D Fund with Israeli Investors**

Business between Israel and India has been growing at an exponential pace. Most recently Reliance Industries, India’s largest holding company, is considering the establishment of a joint R&D fund, with Israeli and Indian investors..

Reliance chairman and managing director Shri Mukesh Ambani met with Industry and Trade Minister Ehud Olmert, who recently headed a business delegation to India. Ambani added that he would like to assist in developing better trade relations between India and Israel.

Reliance, with a market cap of \$20 billion on the Mumbai exchange, deals mainly in energy and infrastructure. It already works with several Israeli companies, including Israel Shipyards, RAD Data Communications and the optical ethernet startup Atrica.

Currently, annual trade between Israel and India is at an estimated \$1.6 billion, mostly in diamonds. Military trade totals roughly the same amount. Some 700 Israeli companies export to and operate in India. Estimates are that exports will grow by 70% over the next four years.

### **Israeli-Chinese VC to Raise \$40m.**

The Chinese public company Datang will be the strategic (non-investing) partner in the new Israeli-Chinese venture capital fund ICVC, being set up by Platinum Neuron Ventures (PNV), just three months after Infinity Venture Capital announced the establishment of the first Israeli-Chinese VC fund.

The new fund will manage about \$40-\$50 million. PNV, which is managed by Shuki Gleitman, Ami Dotan and Yigal Livne, is using a different business model from that being used by Infinity, and will be financed by investors outside China. PNV’s current investors are from Hong Kong and Singapore. Dotan, a managing partner at PNV, says the fund expects to complete its first round of capital raising of some \$20 million, by January 2005.

The model involves investing in new companies for the Chinese market that are established from existing start-ups belonging to the fund’s investment portfolio as well as in

future ventures in which Datang will serve as a strategic partner.

### Four Startups on Red Herring 100

Four Israeli companies made the Red Herring list of the 100 Top Innovators. The nifty five are Magink Display Technologies, Mobileye, Atrica and Crescendo Networks.

The final 100 were chosen out of a list of 900, says Red Herring. Criteria included revolutionary technology coupled with significant progress in marketing, sales, customer service and labor relations.

Magink, founded in 2000, is developing reflective digital ink technology, allowing for the use of digital displays with no need for energy when presenting the message. The result is far lower costs when compared with other display technologies. Applications include furnishings, advertising billboards, and construction materials.

MobilEye, founded in 1999, is developing a chip allowing real-time decryption of video signals to identify and locate objects. The chip is supposed to improve safety in driving. Its system has been developed into eight applications that help maintain distance, prevent deviation from the driving lane.

Atrica, also dating from 2000, makes communications and switching technology for metro area communications carriers. Its Ethernet standard technology serves as a lower-cost alternative to SDH/SONNET technology for large enterprises. Atrica is also remarkable for the amount of money invested in it – no less than \$170 million to date.

Crescendo Networks is the youngest. Created in 2002, the startup developed a hardware standard to manage server interconnection, which significantly improves the performance of server ranches and information centers.

### In-Flight Cell Phone Usage

Thanks to a new Israeli technology, in-flight cellular phone usage may become a reality. Qualcomm Israel, a subsidiary of the US-based Qualcomm, has developed technology which would allow for clear, safe cellular phone calls to be made while traveling in an airplane.

This past summer, the company carried out tests, together with American Airlines, to demonstrate the effectiveness of the satellite-based air-to-ground cellular service.

The successful test demonstrated in-cabin voice communications using commercially available CDMA mobile phones and an in-flight third-generation (3G) 'picocell' network. "During the flight, we were able to support about 10 calls, as well as SMS text messages," Qualcomm Israel's Boaz Bryger

was quoted in an Israeli publication. .

"We tried every combination - incoming and outgoing, from mobile to mobile, land to mobile, etc... The voice quality was good, and the system was stable." Bryger directs engineering at the company's Israel headquarters and headed the engineering team that was in charge of the project.

Qualcomm's "pico-cell" technology consists of a laptop computer sized Base Station System which acts as a cellular antenna within the aircraft. The pico-cell then beams the voice-data via satellite to the ground networks. Essentially it is an IP-based wireless access network.

According to USA Today, developers believe that travelers will use their cell phones while in the air if they are charged less than a dollar a minute. Customers would pay by entering their credit card numbers upon placing a call, or may just have the charges added to their monthly cell phone bills.

### Shopping.com Cops 6th Spot in Deloitte Fast 500

31 Israeli companies were placed in the list of the 500 fastest growing companies in Europe, the Middle East and Africa (EMEA) published by consulting firm Deloitte. Price comparison company Shopping.com (Nasdaq: SHOP), which was ranked sixth in the list, was the only Israeli company to gain a very high ranking.

This program is sponsored by Deloitte's Technology, Media & Telecommunications (TMT) global industry group.

The rankings are based on revenue growth rates in the period 1999-2003. The list is topped by British internet travel and vacation booking company Lastminute.com, which posted growth of 96,512%. Shopping.com had growth of 12,669%.

Two other Israeli companies made the top twenty on the list: wireless network optimization company Schema in tenth place, with 7,619% growth; and application traffic management company Expand Networks in 19th place, with 3,904% growth.

### Gene Therapy used on Patients with Bladder Cancer

A medical team led by Dr. Patricia Ohana of the University of Jerusalem has achieved the almost total disappearance of cancerous cells in vivo using gene therapy in a clinical test carried out on two patients.

The team used a toxic gene that led to the destruction of the

cancerous cells without damage to the surrounding cells. In order to introduce the gene effectively into the cancerous cells, the team used the in vivo jetPEITM reagent from Polyplus-transfection.

The study, presenting the results of this experiment was published in June 2004 in the Journal of Gene Therapy and Molecular Biology.

This experiment proves that, with the use of PEI, repeat treatments can be used to combat chronic diseases such as cancer. These treatments are complementary to surgery and chemo- and radiotherapies.

Polyplus-transfection was created in 2001 for the exploitation of the exclusive license relating to discoveries made by the Genetic Chemistry Laboratory of the Louis Pasteur University in Strasburg.

Having recently raised 2.6 million euros, the company achieved a turnover of 750 000 euros in 2003.

The jetPEITM and its derivatives for gene transfer are only part of the range of Polyplus-transfection products, which also include internally developed vectors for RNA transfer (RNA interference). This RNA transfer technology opens up new horizons in screening products for the many targets as revealed by human genome sequencing.

## Israeli Stem-Cell Technology Repairing Nerves

The technology was developed at Tel Aviv University and is being used by BrainStorm Cell Therapeutics, which has established an Israeli subsidiary to commercialize it. The patent-pending technology, called NurOwn, is based on discoveries made by Professor Eldad Melamed, head of Neurology at Rabin Medical Center, and expert cell biologist Dr. Daniel Offen, at the Felsenstein Medical Research Center of Tel-Aviv University – together with their research teams.

The technology enables the differentiation of bone marrow-derived stem cells into functional neurons and has already been demonstrated successfully on animals. BrainStorm is developing cell-therapy products with adult stem cells to be used in the treatment of neurodegenerative diseases. They are initially focusing on the development of bone marrow derived neural-like cells for the treatment and rehabilitation of those suffering from Parkinson's disease.

“Our company has chosen to focus on autologous cell therapies, which use cells from the patients' own bone marrow to repair a physical dysfunction, since we believe that this approach may circumvent many of the safety hurdles

and ethical controversies involved in competing stem cell research,” said Yaffa Beck, President and CEO of BrainStorm Therapeutics.

Although the debate over stem-cell research has gotten quite heated in the United States, due to religious feelings on the matter, the use of stem-cells taken during the first 40 days of the embryonic stage is considerably less problematic according to Jewish law. During its recent conference in Jerusalem, the Orthodox Union emphasized its support, “consistent with Orthodox rabbinic teaching, for the continuation of and public funding for cutting-edge biotechnology research, including embryonic stem-cell research.”

## NEC America Chooses ART Voice Control

ART Advanced Recognition Technologies, a leading provider of voice interface solutions for mobile devices, announced that NEC America, Inc. (NEC), a leading provider of innovative communications products, solutions and services has selected the smARTspeakr NG embedded speech interface for its recently launched NEC 232E High Definition Mobile (HDM) handset. With no advanced training necessary for the speaker-independent voice interface, NEC customers can enjoy the phone's voice control features right “out-of-the-box.”

The smARTspeakr NG voice-recognition technology was the first to successfully combine all voice dialing and voice control functions for speaker-independent and speaker-dependent systems. It was designed as an all-in-one bundle ideal for the small footprint and tight processing power of today's mass-market handsets. Combining a decade of ART's award-winning technologies, smARTspeakr NG offers voice-enabled features such as name dialing, continuous digit dialing, command and control, and trainable continuous digit dialing for custom languages.

## Kodak is Acquiring Orex

Israeli company Orex Ltd., is being acquired by Kodak for \$55 million in cash. Kodak will pay \$45 million in cash, in addition to the \$10 million in cash that Orex owns.. Kodak will integrate Orex's activities with those of Algotec, another Israeli startup that it bought for \$58 million in 2003.

In 2000 Kodak also purchased another Israeli startup, Picture Vision, for \$90 million. The latter was closed the next year.

Orex's technology allows the taking of digital dental X-rays and storing them, without the use of film. The pictures can then be viewed on the dentist's own computer and saved. Orex had revenues of about \$20 million in 2004. It employs

70 in Israel and Boston. The company is profitable.. Orex was founded in 1996 as Digident. Orex has raised a total of \$11.6 million over the years.

The firm was nearly shut in 2000 after losing \$3 million on \$2.5 million in sales. Management changes were responsible for a turnabout in the company's fortunes. Saifun Inks Major Contract with Sony

Saifun Semiconductors has announced the obtaining of a contract estimated to be valued at hundreds of millions of dollars with the Japanese electronics conglomerate Sony. Sony plans to use the Israeli company's flash memory technology in all its mobile devices, ranging from MP3 players to digital cameras.

The Sony agreement along with two other deals Saifun signed in recent years with Fujitsu-AMD and Infineon are expected to yield hundreds of millions of dollars in royalties and other revenues in the coming decade for the Netanya-based firm.

Saifun was established in 1997 by former combat pilot and serial entrepreneur Boaz Eitan. The company develops technology that quadruples memory capacity in serial flash memory devices. Previous technologies store one bit of memory on each cell, while Saifun's technology has two- to four-bit capacity per cell. Saifun's non-volatile memory, called , can be used not only in mobile devices, but also in electronic appliances and newer large household appliances, such as refrigerators, washing machines and flat-screen TVs, that will begin using memory chips in the next few years.

Saifun is planning to go public on the Nasdaq exchange at a company value of \$400-\$500 million, and the Sony contract's timing is likely to attract investors.

"This technology will keep Saifun at the center of achievement for the long term, allowing for continued relationships with giant concerns to which Saifun has already granted licenses to use various technologies we developed, including Fujitsu and AMD.

### **British Telecom Allocating \$200 million for Israeli Hi-Tech Investments**

British Telecom, according to Israel's Export Institute will invest \$200 million in Israeli technologies. The U.K. company is earmarking the money for investment over three to five years.

Among the companies being considered is Netanya-based BitBand, a provider of technology for streaming data-rich media over Internet networks. Emblaze (LSE:BLZ), which also makes media-streaming technology, is also on the list. BT also is interested in Maxbill and Mind CTI (Nasdaq: MNDO), which both develop systems for customer care and billing. Another candidate is TeleMessage, which designs

applications for mobile operators.

Septier Communications of Petah Tikva, which makes network platforms to help cellular carriers maximize revenue. Some 200 BT personnel recently met with representatives from these companies at the R&D headquarters in Ipswich, England.

### **Breast Cancer Patients Get Individualized Therapy in Nottingham Trial**

Nottingham City Hospital Trust and Optimata Ltd. announced an innovative study aimed at improving the treatment of breast cancer by providing patients with individualized therapies.

The study aims to validate the ability of Optimata's proprietary computerized modeling technology to accurately simulate the breast cancer process in individual patients as well as predict their response to therapy.

It is expected that this study will be followed by a second study, where Optimata's Virtual Cancer Patient technology (VCP) will be utilized to suggest improved dosing and scheduling regimens for breast cancer patients undergoing chemotherapy. In the latter study doctors will customize each patient's therapy according to an individualized protocol created by Optimata's technology.

This study represents the first-ever use of computer models to improve the efficacy of cancer therapies on an individual patient basis.

Optimata is a developer of predictive biosimulation technologies for use in drug development and in the individualization of therapeutic treatments. For drug developers, Optimata offers a rational approach for the selection of patient populations and the optimization of drug scheduling and dosage. Optimata's technologies significantly reduce the number of pre-clinical and clinical trials required, by enabling trials to be performed only for decisive validations. Similar nanobridges between electrical contacts made of conducting materials such as gold may one day form the basis of tiny nanotransistors that will be used to build tiny, fast and efficient electronic circuits. In addition, the use of DNA may allow other biological molecules to be integrated into the circuit design that would interact with the DNA strands, thus modulating the behavior of the device. In their experiment, the results of which were published in Applied Physics Letters, the team managed to create nanotransistors with 10 percent of the available gold contact pairs, a figure they are currently working to improve.

The simple composition of DNA has inspired many scientists around the world to engineer its component nucleotides into new structures. Double-stranded DNA is shaped like



a twisted ladder, each “step” constructed of two separate nucleotides. These nucleotides link up in a pre-determined way: thymine always affixes to adenine and guanine always to cytosine. Not only have scientists been able to link bits of DNA together to form new structures, they can make them attach to metals and carbon nanotubes, those atom-thick sheets of carbon rolled up into extra-strong hollow tubes the width of a mere 10 hydrogen atoms.

Though the Weizmann team is not the first to try building anotransistors using DNA, their method appears to be the most suitable to date for large scale production and the development of a variety of industrial applications.

Optimata’s technology is based on its computer-generated method of accurately predicting how individual patients or patient populations will respond to a compound. The technology combines computer models of human physiology, specific diseases and the therapeutic impact of a compound. The in silico technology enables drug developers to conduct experiments at an unprecedented scale, enabling an unlimited number of “virtual trials” to be carried out on an almost infinite combination of dosages, treatment schedules and patient population characteristics.

### **IDF launches Digital Army Program**

Jane Defense Weekly reports that the Israel Defence Force (IDF) has launched its ambitious command, control, communications, computers and intelligence (C4I) Tsayad (Hunter) Digital Army Programme (DAP) - estimated to be a NIS4 billion (\$900 million) investment over a decade. The Israeli Ministry of Defence (MoD) signed a NIS875 million contract with Elbit Systems, the DAP’s prime contractor, on 13 December. In addition, the programme has been allocated \$500 million of US Foreign Military Funding ...

### **Getting Cancer Therapy into the Bones**

When prostate cancer, one of the leading causes of cancer death among men, spreads in the body, it most often goes to the bone where it is particularly difficult to treat. Metastasis to the bone is implicated in over 70% of prostate cancer deaths. Prof. Zelig Eshhar, Head of the Immunology Department at the Weizmann Institute of Science, has now shown how a treatment that works on cancer in the prostate can be redirected to the bones.

The treatment, which was developed in Eshhar’s lab a number of years ago, is based on cells that have been engineered to combine two different types of weapons used by the immune system to fight invaders. Antibodies are best at

recognizing foreign or altered molecules such as antigens on the outer walls of bacteria, viruses or cancer cells. T cells are better at killing unwanted cells, but not as adept at identification, especially of tricky cancer cells that may already have developed methods of evading detection by the immune system. By attaching an antibody-based structure designed to recognize specific cancer cells directly to a T cell receptor, Eshhar produced custom-modified cells, dubbed T bodies, which are proficient at both finding and killing cancer cells.

However, getting T bodies into the bone to treat metastasized cancer was another story. The cancer in this case is likely to be spread throughout the bone, in hard to reach places. When Eshhar’s research team first injected T bodies into immunodeficient mice in which human prostate cancer developed in the leg bones, they saw no real improvement, indicating to them that the cells were not getting to the cancer in significant enough quantities to have an effect.

To address the problem, the Weizmann team, which included Dr. Jehonathan Pinthus of Sheba Medical Center, Tel Hashomer, “preconditioned” the mice using one of two strategies already in use in some forms of cancer therapy: low doses of radiation or a specific chemotherapy drug. Both treatments cause some disruption in the bone marrow, the intended target of the T bodies. In response, the bone marrow sends out a chemical distress signal to the immune system. This signal not only alerts immune cells such as T cells to the danger, but assists them in homing in on the problem area and in passing through barriers that might otherwise prevent them from getting into the bone marrow tissue.

Mice treated with either therapy 24 hours prior to being injected with T bodies showed a significant drop in the tumor marker, PSA (an indicator of cancer levels), a reduction in the tumor load and prolonged survival. Because the method holds promise for treating disseminated cancers that are resistant to other forms of therapy, Eshhar hopes to move it into clinical trials in the near future.

### **Transistor Genetics**

Take a little DNA; add a pinch of carbon nanotubes; sprinkle in a few grains of gold, all on a clean silicon surface, and whip up a batch of nanotransistors – that’s pretty much what the research group of Prof. Ron Naaman of the Chemical Physics Department of the Weizmann Institute did. Only, they began with even more basic ingredients: tiny spoonfuls of phosphates, sugars and nucleotides that were used to create unique strands of DNA programmed to form attachments with carbon nanotubes.

Next, they used the same method to create another set of DNA strands that would hook up to miniscule electrical contacts made of gold that were anchored on the silicon surface. Afterwards, they added the first group of ingredients to the second and mixed well. The DNA strands fastened to the carbon nanotubes latched on to the strands attached to the gold contacts. The end result was a sort of carbon nanotube “bridge” spanning the silicon surface between two gold contacts.

### **Sic Transit Gloria: Pharmos has no Answer for Traumatic Brain Injury**

At the head of Pharmos is its chairman and CEO, Dr. Haim Aviv. He founded the company in the 1990s. The man who worked with cannabis beforehand was Prof. Raphael Mechoulam. It was in the 1960s when Dr. Mechoulam, later an Israel Prize laureate, succeeded in isolating the active chemical ingredients in cannabis, one of which, Tetrahydrocannabinol (THC), was discovered to affect the body’s physiology, as well as having psychoactive properties. The active ingredient was synthesized in the 1960s, and in the late 1980s, Hebrew University researchers were able to synthesize HU-211 - today’s dexanabinol. Yissum Research Development Company of the Hebrew University owns four of Prof. Mechoulam’s cannabis-based patents that are the foundation for Pharmos’ licenses to develop drugs.

Dr. Aviv has promoted himself as the Father of Biotechnology in Israel. However, this title rightfully belongs to an American Jewish lawyer Dr. Fred R. Adler. who devoted nearly five decades, on business development, especially in the areas of science and technology. As a partner at Fulbright & Jaworski for 44 years, his practice has run the complete gamut of corporate law, including venture capital projects and leveraged buyouts.

In the late 1960s Adler became intrigued by the young State of Israel. Messrs Dan Tolkowsky and Uzia Galil convinced Adler to back several Israeli technology companies. Adler brought them to the American Nasdaq market. Subsequently, in 1980 he convinced Dr. Haim Aviv to found BioTechnology General, Israel’s first biotechnology company. By this act Dr. Adler deserves the title as the Father of Biotechnology in Israel. Those were heady days and this writer remembers Dr. Aviv sitting among boxes of equipment in BTG’s first home at the Weizmann Institute. Aviv who was to be interviewed said “If you had just received \$2.0m. of laboratory equipment you too would be speechless.”

Annually 300,000 cases of Traumatic Brain Injury are admitted to hospitals in the US. Of those, 100,000 are classified as severe and 55,000 are very severe. The latter have a very high mortality rate. This was the space into which Pharmos entered.

Dr. Aviv worked unceasingly over the years, to raise more than \$150m to advance the scientific work at Pharmos.

Pharmos’ main product, dexanabinol, is a synthetic, non-psychoactive cannabinoid in late-stage clinical development for the treatment of severe traumatic brain injury (TBI). In September 2003, the United States Food and Drug Administration (FDA) granted fast track designation to dexanabinol for treatment of severe traumatic brain injury. Fast track designation allows New Drug Application (NDA) submission on a rolling basis as each section is completed, and requires an FDA priority review of the full NDA. The development of dexanabinol for severe traumatic brain injury, involved only one pivotal clinical trial. In mid-March 2004, it completed enrollment of American and international TBI patients in its pivotal Phase III clinical trial of dexanabinol.

The publicly traded Pharmos shares became a speculators dream. Wide swings in prices and most recently the hope that if the trials were successful the Pharmos shares would soar, maybe double or even triple in price.

However, the pivotal Phase III clinical trial found the drug no more effective than a placebo in aiding patients with severe head traumas. On the announcement the shares of Pharmos plummeted 66% to a 19-month low of \$1.18 . However, failure is never tolerated on the investment battlefield.

#### **Pharmos (PARS)**

**Share price as of Friday’s Dec. 17  
close:\$3.50**

**Share price December 20, 2004 : \$1.18**

**Change: -66.3%**

**Volume: 80.6 million shares, daily average  
1.0 million shares**

Pharmos announced that dexanabinol “did not demonstrate efficacy” in treating traumatic brain injury, or TBI. It will cease efforts to develop the drug in that direction, though it will pursue development for another condition entirely – memory impairment after cardiac surgery.

However, the company has not been mortally wounded as

it has \$61 million in cash and no long-term debt. The current cash burn rate is about \$2 million a month. While it has received research grants in the past, without sales, Pharmos has enough money to survive the next 2 1/2 years.

Recent stock sales by company insiders, including Chief Executive Haim Aviv and President Gad Riesenfeld, have raised a few eyebrows among investors, especially in light of the one day steep decline. In the past month alone Riesenfeld sold 205,138 shares, while Aviv sold 199,376.

"In that matter, we all behaved honestly, fairly, and delicately," Aviv was quoted as saying, in an Israeli daily business newspaper.

"We received the test results last night and disappointment is too soft a word to describe what we feel today," Aviv went on. "It is very sad. I have lost a great deal of energy in recent years and we had hoped for far better. But we knew it is a risky business, and that the results we received today were possible. I see the shareholders before my eyes and it is a hard thing to let them down. I also see the patients we thought we could help. We really thought we could make a significant contribution to medicine."

Fred Adler, when told of the failure of the Phase III trials and the collapse of the Pharmos shares said, "There will always be far more failures than successes among the companies attempting to create new drugs. Pharmos, when founded, appeared to have had a good deal of logic behind its efforts. In such situations it seems to me that making the effort and failing is far better than than not having tried at all." Asked about his opinion of Dr. Aviv, Fred Adler answered, "While Aviv's ability to create and to manage a successful biotechnology company is still to be proven, I consider him to be a man of substantial intellectual ability and enormous drive, coupled with great self-confidence".

### **Delek Automotive Best TASE Performer of Past Decade**

The Tel Aviv Stock Exchange (TASE) released a study on the best creators of value on the TASE in 1995-2004. The study found that the five best performing shares achieved an average real annual yield of 30-40% over the past decade.

Best performer was Delek Automotive Systems (TASE: DLEA), with an average annual yield of 38%. Delek Automotive was also the best performing share in last year's study, which covered 1994-2003.

Delek Automotive was followed by FMS Enterprises Migun (TASE:FBRT) and Frutarom Industries (TASE:FRUT), which

made the list thanks to sharp rises in their share prices over the past year. Both shares achieved an average real annual yield of 37.5% over the past decade.

Lipman Electronics Engineering (Nasdaq:LPMA; TASE: LPMA) was in fourth place, with an average annual yield of 37%. Retalix (Nasdaq:RTLX; TASE:RTLX) was in fifth place, with 30%. Retalix's market cap rose to over NIS 1 billion following its issue on Nasdaq in April 2004, the threshold for the study.

Teva Pharmaceutical Industries Ltd. (Nasdaq:TEVA; TASE: TEVA), which accounts for 22% of the aggregate market cap of TASE-listed companies, created the highest value in shekel terms, with an average annual yield of 25% over the past decade.

The next four companies in the list were also included in last year's top ten: Harel Insurance Investments (TASE: HARL), Clal Insurance Enterprises Holdings Ltd. (TASE: CLIS), Menorah Holdings (TASE:MORA1;MORA5) and Delek Group (TASE:DLEKG).

They are followed by NICE Systems (Nasdaq:NICE; TASE: NICE), Osem Investments (controlled by Nestle (SWX: NESN)) (TASE:OSEM), Blue Square Properties and Development (TASE:BSLQ), and Israel Phoenix Assurance (TASE: PHOE1;PHOE5), which fell last year's top ten to the second group of ten, after posting low or negative returns in the past year.

### **Retalix Enters Japan**

Retail industry software company Retalix (Nasdaq:RTLX; TASE:RTLX) has announced that Drug-Eleven in Japan has signed a contract to install Retalix StoreLine store solutions and ReMA chain management platform throughout the chain. Drug Eleven is a leading Japanese health & beauty chain of 169 stores based in Fukouka. No value for the deal was disclosed.

Retalix says that its offering for Drug Eleven provides for advanced store operations and management activities hosted by a web-enabled suite of central applications, including item category management, promotions, loyalty, and data reporting and analysis.

Drug Eleven plans to grow at a rate of 20 new stores per year during the next few years.

## Gluing Bones Together

A new material that fuses biological and synthetic substances at the molecular level speeds bone and cartilage repair. Its creators at the Technion-Israel Institute of Technology say laboratory studies have shown the new gel promotes healing by gluing bone pieces together and stimulating tissue development.

A report on the work, authored by lead researcher Dror Seliktar of the Technion Department of Biomedical Engineering, who was assisted by graduate student Liora Almany-Levi, was published online in the November 2004 Biomaterials journal. Animal tests are now underway.

"Gelrin is a brand new material engineered molecule by molecule, not just mixed together," Seliktar said, adding that while the two components are relatively cheap and readily available, "it's the way we engineer them that represents a breakthrough."

Orthopedic surgeons currently use biological materials such as collagen and fibrin to stimulate tissue growth in bone injuries. However, these biological materials tend to leach out of the injury site long before the healing is complete. As a result, the injury may take longer to heal completely.

Seliktar explains that the difference in Gelrin lies in the unique combination of natural and synthetic molecules used to engineer the new material. Synthetic materials provide enough strength to remain in the injury site but are limited in their ability to promote healing. Biological materials are too weak to stay affixed for the duration of the healing process. Instead of using one or the other – as is true with the making of other orthopedic materials -- he used a protein called fibrin, the protein in blood plasma responsible for clotting. To it, Seliktar attached a synthetic material called polyethylene glycol, a plastic used in contact lenses and other biomedical applications.

The result is a three-dimensional material with the biological properties of fibrin and the strength of plastic, providing structural support and encouraging tissue growth. Since the bone cells come in contact with fibrin, they are "tricked" into also accepting its synthetic partner. Gelrin can be adjusted to different strengths and degradation rates according to its intended application.

Injected into the damaged area, the broken bone fuses

within the Gelrin, which at that point breaks down and is

excreted in the urine. While metallic pins and plates will still be necessary to affix the bone fragments, Gelrin will facilitate bone regeneration so that these metallic parts will remain in place for a shorter duration.

A patent application has been submitted. Since polyethylene glycol and fibrin are both already approved for biomedical use, the U.S. Food and Drug Administration approval process is expected to be relatively quick. Seliktar and his team are currently working on other applications for Gelrin, such as the creation of cartilage tissue outside the human body and the cultivation of artificial heart muscles.

With some 1 million orthopedic bone substitution procedures performed annually in the United States (source: Datamonitor Market Dynamics, Bone Substitutes and Growth Factors, December 2002), Gelrin could have widespread applications. It could reduce the need for bone transplants and heal bone defects caused by cancer, trauma or age related degeneration; it could also be used to treat sports injuries and aid in spinal fusion operations.

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