

ISRAEL HIGH-TECH & INVESTMENT REPORT

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Chiasma teams with Roche

Chiasma Inc., which develops oral versions of biological drugs, has signed a strategic development agreement with Roche AG (SWX: ROG). The deal is extraordinary in terms of the financing: a \$65 million down payment for Chiasma, followed by \$530 million in milestone payments and double-digit royalties on net sales.

The deal is Roche's largest commercialization agreement with an Israeli drug development company to date. Chiasma's product, Octreolin, is a biological drug for the treatment of acromegaly, which is caused by excessive excretion of the growth hormone, resulting in abnormal growth of bones and internal organs, which can lead to heart problems, increased perspiration, and sleeping difficulties. The excess excretion is caused by a benign tumor in the pituitary gland. The tumor can sometimes be surgically removed to cure acromegaly, but not always.

The global acromegaly market is estimated at \$1.8 billion, of which \$1.4 million is for a drug made by Novartis AG (NYSE:NVS; LSE: NOV; SWX: NOVZ). Octreolin is an oral version of Novartis's drug, and if it is commercialized, Roche will compete with it against Novartis.

The drug is currently administered by frequent and very painful injections deep into the muscle or beneath the skin, with a long, thick needle. The injection requires up to 90 seconds to deliver, because the substance is very viscous.

Chiasma COO Roni Mamluk said "You see the needle and get chills. You usually have to receive the injection once a month from a nurse, because it very hard to administer the injection at home."

Mamluk says that Octreolin replaces the drug with an oral product, which was made possible

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Observed: The outburst before the blast

At a first-of-its-kind conference for ultra-Orthodox Jews

Amdocs, SingTel found joint Israeli development center

Australia approves Mazor Robotics spinal surgery device

by Chiasma's proprietary technology, which briefly opens tiny gaps in the intestinal wall allowing the absorption of the drug. Biological drugs, such as peptides, cannot usually be absorbed through the intestinal wall, because they dissolve in transit. Chiasma's capsule is administered twice a day. The product is undergoing a Phase III clinical trial. The company found no side effects of the drug, after nine months. Mamluk believes that the drug can be launched in 2015, at which point the company will see double-digit royalties.

Chiasma was founded in the early 2000s, but went through several crises before being reinvented in 2008 under Mamluk and CEO Frederic Price, an American. Price and Chiasma's legal adviser are based in the US, and the company has 50 development staff in Israel.

Chiasma's investors, most of whom have been with it from the beginning, include MPM Ventures, Abingworth, Arch Venture Partners, F2 and F3 Ventures, and 7 - Med Health Ventures LP. Ofer Hi Tech Ltd. invested in the company's early rounds, but not in subsequent ones. Chiasma raised \$38 million in its last financing round.

Intel Israel exports doubled in 2012 to \$4.6b
Intel Israel president Mooly Eden commented that: "were it not for Intel, Israel's high-tech exports would have fallen by 10% last year".

Exports by Intel Israel Ltd. more than doubled to \$4.6 billion in 2012 from \$2.2 billion in 2011, it announced at its annual press conference. The company's workforce rose by 10% during last year, or 760 employees to 8,500. Indirect employees totaled 25,500. Reciprocal procurements in Israel totaled \$737 million in 2012, and Intel Corporation (Nasdaq: INTC) invested \$1.1 billion in its Israeli operations.

Intel Israel says that Intel Corporation has

invested \$10.5 billion in Israel over the past decade, and received \$1.3 billion in Israeli government grants.

Between the lines of Intel Israel president Mooly Eden's remarks was the message that it is very worthwhile for Intel's next fab to be built in Israel. He says that Israel's high-tech economy rests on four pillars: defense industries, start-ups, large domestic companies, and multinationals. "I do not think that there is any large Israeli company which can invest billions in R&D, which is why a balance is needed between these four segments," he said.

Eden said that he was pleased to show a slide which states that Intel Israel accounts for a tenth of Israel's total industrial exports. "You can now say, 'Wow', when Aviad (Intel Israel CFO Aviad Avni) showed numbers, which we say are fantastic. Were it not for Intel's improved performance last year, Israel's high-tech exports would have fallen by 10%, which is a warning light for me," he said. He added that Intel Israel

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was responsible for a third of Israel's exports to China.

Not just our cars, but also living organisms need antifreeze to survive in the cold

If you thought antifreeze was only something that was necessary to keep your car from freezing up in the winter, think again. Plants and animals living in cold climates have natural antifreeze proteins (AFPs) which prevent ice growth and crystallization of organic fluid matter. Without such antifreeze, living matter would suffer from frost damage and even death.

Production of such antifreeze proteins is one of the major evolutionary routes taken by a variety of organisms, including fish, insects, bacteria, plants and fungi. Understanding how this mechanism works is not only significant in itself, but also has important implications for improving the world's food and medicinal production, believe researchers from Israel, Canada and the US who investigated how the process works.

Despite half a century of research, the mechanism underlying the activity of the natural antifreeze proteins is still unclear. One of the debates in the academic community regards the chemistry and physics behind the interactions of antifreeze proteins and ice. In particular, there is an ongoing argument over whether the binding of the proteins to ice is reversible and whether continued presence of these proteins in solution is necessary for prevention of ice growth.

The challenge in unraveling these questions stems from a variety of technical problems associated with the growth and tracking of tiny ice crystals in an environment that mimics the surroundings of the antifreeze proteins in nature.

The Hebrew University researchers studied the antifreeze protein of the yellow mealworm. This

protein is a hyperactive AFP with a potency to arrest ice growth that is hundreds of times greater than the potency of fish and plant AFPs.

In their study, published in the American journal PNAS (Proceedings of the National Academy of Sciences), the international team of researchers biochemically created a fluorescent marker version of the AFP that allowed for direct observation under a microscope lens. They injected this protein into custom-designed microfluidic devices with minute diameter channels.

The microfluidic devices were placed in cooling units engineered with a temperature control at the level of a few thousandth of a degree, so that ice crystals of 20 to 50 micrometers could be grown and melted controllably, all under microscopic observation.

Using their specialized system, the researchers were able to show that ice grown and incubated in an antifreeze solution remains coated with protein and therefore protected. They further showed that the AFPs bind ice directly and strongly enough so as to prevent the ice from growth even after there is no longer any further presence of protein in the solution.

The significance of the findings published in this study is not only on the scientific level but also practical. For example, fish AFPs are already used in low-fat ice cream to prevent ice recrystallization, thereby maintaining a soft, creamy texture. These proteins could be used in other frozen foods for maintaining the desired texture without additional fats, say the researchers.

In medicine, AFPs can be used to improve the quality of sperm, ova and embryos stored in a frozen state, and for cold or cryopreservation of organs (freezing at extremely low temperatures) for transplantation. They can also be used in cryosurgery and in agriculture.

Other studies on AFPs focus on preparation of recombinant plants and fish with improved survival rates under cold and dehydration conditions. Such recombinant crops may improve food dispersion over the world, the researchers believe.

Most active venture capital funds in Israel in 2012

Israeli VC fund Carmel most active in 2012 with 11 first investments

Ninety venture capital funds made first investments in Israeli and Israel-related companies in 2012 according to the Most Active Venture Capital Funds report prepared by IVC Research Center. Nineteen Israeli and foreign venture capital funds made three or more first investments, with the most active being Carmel Ventures, an Israeli VC fund managed by Shlomo Dovrat and Avi Zeevi. Carmel made 11 first investments in 2012, compared with only three in 2011.

Horizons Ventures, controlled by Hong Kong investor Li Ka Shing, made 10 first investments, followed by two Israeli funds, Genesis and Gemini, each of which made seven first investments. Jerusalem Venture Partners made six first investments, followed by Magma Venture Partners with five.

Five different venture capital funds - including Pitango, Israel's largest fund - made four first investments in 2012. Eight others made three first investments, while each of 19 funds, including Israeli micro-funds, invested in two companies during the year. The remaining 52 venture capital funds made only one investment each.

"Israeli and foreign venture capital fund activity clearly demonstrate that the market is thriving and filled with players," explained Marianna Shapira, IVC's Research Manager. "At the same time," she noted, "most first investments in the

last year were relatively small. This reflects a certain caution that investors are applying in their activity, trying to fully assess a company's potential before committing substantial funds."

Boeing product range on offer with Elbit countermeasures

Boeing will offer Elbit Systems-produced directed infrared countermeasures (DIRCM) equipment with all of its military and civil aircraft, under a new memorandum of understanding signed by the companies.

"Boeing is partnering with pioneering firms worldwide to bring advanced technology to our customers," says Roger Krone, president of the company's Network & Space Systems division. "Our relationship with Elbit is an example of how we are enhancing our portfolio with innovative capabilities for a variety of solutions."

The unit and Boeing Military Aircraft are "working together to integrate the systems on to new and existing aircraft, and to provide signature analysis and end-to-end services and support", the company adds.

The threat posed to aircraft by man-portable air defence systems has grown considerably during the past few years, a factor which prompted Elbit's Elop division to develop DIRCM equipment to protect fixed-wing aircraft and helicopters. This has already been produced for integration with military, commercial and VIP transport aircraft.

Systems available include the Music design, which is suitable for use by helicopters including the AgustaWestland AW101 and turboprop transports such as the Alenia Aermacchi C-27J and Lockheed Martin C-130J. A J-Music version can protect heavy transports and tankers, plus VIP jets, and has been selected for Embraer's developmental KC-390.

Successfully flight-tested recently using an

Israeli air force Boeing 707 tanker, the C-Music system has been designed to defend large commercial aircraft and VIP transports from attack using infrared-guided weapons, and combines DIRCM equipment and a passive missile approach warning system within an aerodynamic pod.

C-Music has already been selected by the Israeli government to protect the nation's commercial airline fleets.

"We anticipate that this joint effort will provide the optimal solution for protecting our customers and creating synergistic value for both companies in this strategic and fast-growing market," says Elbit chief executive Joseph Ackerman.

Team Spacell aims to make Israel third country to land on the moon

An Israeli non-profit comprised of a team of scientists and space enthusiasts, is aiming to make Israel the third country, behind the U.S. and Russia, to successfully land a spacecraft on the moon.

As part of Google's Lunar X Prize competition, Spacell intends for its spacecraft to be as small as possible, harnessing the latest in nanotechnology. It also recently received a significant boost when the Israeli telecommunications company, Bezeq, announced that it would provide an advanced communications infrastructure needed for spaceflight, Israel Hayom reported.

Team Spacell believes the organization can play an important role in raising awareness of space technology in Israel.

"Team Spacell views its participation in this competition as a national mission, one that will help develop its space industry and promote scientific awareness among the country's youth," says Yariv Bash, team leader, on Spacell's

profile on the Google Lunar X Prize website.

Team Spacell's mission has generated significant enthusiasm within Israel's robust academic, scientific and high-tech industry. They have received support from the Israeli Space Agency, Israeli Aerospace Industry, Asher Space Research Institute at the Technion-Israel Institute of Technology, Ramon Foundation, Israeli Nano-Satellite Association, and many others.

In order to win Google's \$30 million Lunar X Prize, a private team must successfully land a robot on the surface of the moon and send images back by the end of 2015. There are currently 25 teams from around the world competing.

Tel Aviv named 2nd best high-tech center

Tel Aviv has made it to the second place, immediately after Silicon Valley, on a list ranking the world's leading high-tech centers, according to the results of an international study.

The report checked different cities' suitability to nurture the success of startup companies, reaching the conclusions the best place for startup companies is Silicon Valley, home to major companies like Google, Apple, Facebook and others.

Tel Aviv comes next, before Los Angeles, Seattle, New York, Boston, London, Toronto and Chicago. The next group of 10 consists of Paris, Sydney, Sao Paulo, Moscow, Berlin, Waterloo, Singapore, Melbourne, Bangalore and Santiago.

According to figures presented in the report, the average age of Tel Avivan entrepreneurs is 36.16, two years older than the average age of entrepreneurs in Silicon Valley.

The study also reveals that in Tel Aviv, startup employees work 9.42 hours a day, less than their counterparts in Silicon Valley who work

9.95 hours a day.

MoneyTree: VC investment in Israel down 29% in 2012

Venture capital investment in Israeli start-ups totaled \$887 million in 2012.

Venture capital investment in Israeli start-ups totaled \$887 million in 2012, 29% less than in 2011, reports Kesselman & Kesselman pwc Israel in its MoneyTree Survey report for the fourth quarter of 2012.

Israeli start-ups raised \$277 million in the fourth quarter, 62% more than in the preceding quarter, but 14% less than in the corresponding quarter of 2011. During the fourth quarter, 52 start-ups raised an average of \$5.3 million each.

Trends in Israeli high tech have greatly changed in the past two years. Foreign funds with no representative offices in Israel are now making the bulk of investment in Israeli companies, together with private investors and micro-funds.

The MoneyTree survey does not take this trend into account. "Looking forward to 2013, we can assume that we will not see an increase in investment in venture capital-backed companies, and that the switch to alternative investment parties will continue," says pwc Israel partner, High Tech Assurance Practice, Rubi Suliman.

The breakdown of investment shows that the communications equipment industry accounted for 31% of total venture capital investment in Israel in 2012. Investment in Internet companies fell to 20% of total investment in 2012 from 23% in 2011, when the industry attracted the largest share of investment. Investment in semiconductor and life sciences companies also fell.

Bonus Biogroup Ltd. (TASE: BONS) announced that it has begun construction of the world's first

plant to produce regenerated bone. The 750-square meter facility at Haifa's Matam High Tech Park will have three wings: a center for the production of bone implants, which will initially be used in clinical trials; an R&D center; and a headquarters and administration center, which will also supervise the company's US development center. The center is scheduled to be completed by mid-year.

The center will include a facility for the production of preordered personalized human living bone implants for supplementing missing bone in the patient, as well as a network of clean rooms and laboratories for oversight and quality control. The facility will meet Good Manufacturing Practice (GMP) standards mandated by the regulators. The company adds that the facility will give it full control of the production process of human bone implants, without the need to rely on partners, and will enable the company to establish and operate a global network of bone implant production centers.

Bonus Biogrop CEO Shai Meretzki said, "The company is moving forward on schedule on human clinical trials, which will begin in a few months. Construction of the first production center of its kind in the world for human bone implants will be an important element for the implementation of the company's unique technology."

Microsoft and Israel's Technion try to predict the future

Joint project uses massive data analysis to predict violent uprising, environmental disasters and global plagues

Could data analysis help us predict the future? Could it be that an Israeli university, along with one of the world's biggest multinational corporations, has succeeded where the likes of Nostradamus have failed?

A joint project by the Technion, Israel's Institute of Technology and Microsoft, was able to use massive data analysis to predict phenomena such as global plagues, environmental disasters and violent uprisings, with up to 90 percent accuracy.

The Technion's Kira Radinsky and Microsoft's Eric Horvitz constructed a program which collects data spanning a 22-year period from the New York Times and other online resources. It then analyzes this data using DBpedia, a resource which uses Wikipedia to add layers of information; WordNet, a tool to analyze the meaning of words; and OpenCyc, a general knowledge database.

All this information provides valuable context that's not available in news articles and which is necessary to figure out general rules for what events precede other, bigger events.

For example, the system could infer connections between events in Rwanda and Angola based on the fact that they are both in Africa, have similar GDPs etc. That approach led the software to conclude that, in predicting cholera outbreaks, it should consider a country or city's location, proportion of land covered by water, population density, GDP, and whether there had been a drought the year before.

"I truly view this as a foreshadowing of what's to come," Horvitz told the MIT Technology Review.

In other occurrences, Radinsky and Horvitz's program was able to predict violent uprisings, disease and events with high death tolls with an accuracy rate of 70 to 90 percent. This recent study is the most extensive of its kind, using a total of more than 90 sources.

Helping aid organizations prepare for disaster

Despite the need for further verification, the research team is certain they have a powerful tool in their hands. The program could benefit aid organizations in preparing for events ahead of time and responding faster to crises, says Horvitz. "We've done some reaching out and plan to do some follow-up work with such people."

"Eventually this kind of work will start to have an influence on how things go for people," Horvitz concluded.

Microsoft does not have plans to commercialize Horvitz and Radinsky's research yet, but the project will continue, says Horvitz, who wants to mine more newspaper archives as well as digitized books.

Magma Venture Partners raises \$100m. third fund

Magma Venture Partners announced the \$100 million closing of its third fund. The firm began raising capital for the new fund in mid-2011, and the new financing brings the amount managed by the firm to \$300 million.

Magma's portfolio companies include crowd-sourcing navigation app company Waze Ltd., Valens Semiconductor Ltd., smartphone data consumption reduction solution developer Onavo Ltd., and Magisto Ltd. Magma's last exits proved that its gambles on investing in fabless semiconductor start-ups have paid off: Provigent was acquired by Broadcom Corporation (Nasdaq: BRCM) for \$340 million in 2011; Wintegra was acquired by PMC Sierra Inc. (Nasdaq: PMCS) for \$300 million in 2010; and DesignArt Networks Ltd. was acquired by Qualcomm Inc. (Nasdaq: QCOM) for \$100 million in 2012.

Magma, founded in late 1999, is a second-generation Israeli venture capital fund; not a firm established with the help of the govern-

ment's Yozma Venture Capital. Magma managing partners Modi Rosen and Yahal Zilka said in a statement, "Closing the financing for the fund in these times is a milestone, and an important foundation for the continued progress of innovation in Israel."

Apple opens Ra'anana development center in Ra'anana. The new center will be staffed by 100-150 employees who were fired several weeks ago by chipmaker Texas Instruments Inc. (NYSE: TXN) (TI), which decided to lay off 250 employees - most of the staff at its Israel development center.

The new Apple development center in the Ra'anana Industrial Zone will be the company's third in Israel after it opened a development center in Haifa last year and acquired flash memory developer Anobit in Herzliya.

TI announced in November that it was laying off 1,700 employees worldwide in an attempt to significantly reduce expenditure. Most of the layoffs were in the wireless communications sector. In Israel, TI's activities are based on two acquisitions from the 1990s - Libit for \$365 million and Betterplay for \$50 million.

Libit's activities, in the cables for modems sector, were transferred to Intel Corp. (Nasdaq: INTC) in 2010, and TI's activities in Israel were mainly based on Butterfly's technological capabilities in short-range communication chips, mainly for Wi-Fi, Bluetooth, and NFC. Apple's new development center has received some of the DNA of Butterfly but in all likelihood Apple will take the Ra'anana center into a different strategic direction.

U.K. investment firm buys Israeli start-up Algatechnologies

Algae in Lake Kinneret can have many positive uses.

Kibbutz Ketura scored its second exit in three years this weekend when Britain's Grovepoint Capital agreed to buy control of its biotech start-up Algatechnologies.

Three years ago Ketura, founded by Young Judaea alumni in 1973, sold solar company Arava Power to Siemens.

Grovepoint is paying an estimated \$15 million to \$20 million for Algatechnologies. Its major shareholders are Ketura and the Jewish Colonization Association. CEO Hagay Tzur and Chairman Ed Hofland currently run the company. Hofland co-founded Arava Power in 2006 with David Rosenblatt and Yosef Abramowitz.

The company has developed a technology harnessing desert sunlight to grow microalgae. Astaxanthin, the dark red pigment found in algae and aquatic animals, is then extracted. The human body cannot synthesize it, so it must be cultivated and consumed, according to the company.

Astaxanthin is "a potent antioxidant that has been proven to have beneficial effects in many health conditions related to or caused by oxidative stress," according to Algatech. It is thus used in the pharmaceutical industry; oxidative damage is linked to aging.

Algatech markets astaxanthin through its Asta-Pure product line. The company sells the substance in pure form, which is added to health and cosmetics products. The company's products have become particularly popular in Japan, and demand is growing in the United States and Europe. The overall market is worth about \$3 billion annually.

Grovepoint, founded in 2010, opened an Israeli branch last year, run by Hagai Stadler and Gil Meirovich. It focuses on Israeli companies in water, energy, agriculture and other natural

resources.

Hofland said over the weekend that over the past 15 years Algatech has chalked up a rare achievement: commercially producing a unique algae. He said the company had been looking for an investor with economic experience and international commercial savvy. Grovepoint has vision that can realize Algatech's potential, he added.

Leon Blitz, Grovepoint's co-founder, said astaxanthin had many health benefits. He said his company sought to invest in research and development for new algae strains and by building up a line of products based on astaxanthin.

\$4000-per-jar caviar has socialist origins

Some leading chefs believe a kibbutz in Israel is now producing the world's best caviar. More than seven decades after being founded based on socialist ideals, an Israeli kibbutz is producing the most capitalist of foods.

Caviar fetching \$4000 for a two-pound jar is being shipped more than 5,600 miles away to be served at some of New York's finest restaurants.

The kibbutz movement was born as an alternative way of living based on socialist values.

Eastern European immigrants formed these agricultural communities with the dream to settle the Holy Land. They had strict rules including communal sleeping for children, communal eating rooms and no personal profit -- meaning everyone is equal.

As Israel developed into the "nation of start-ups," the kibbutz found itself in an existential dilemma. How do you survive with socialist ideals in the digital age? And how do you persuade youngsters to stay and not move to cities?

Yigal Ben Zvi is a member of Kibbutz Dan chose to take matters into his own hands. With the help of eight workers, he now produces some of the best farmed caviar in the world.

A sturgeon is thrown into a bucket before it is examined by a biologist at a the fish farm at Kibbutz Dan in northern Israel.

Two decades ago, Ben Zvi was raising goldfish when he looked for a new way to develop the kibbutz business.

Overfishing in the the Caspian and Black Seas then brought the sturgeon to the brink of extinction, which resulted in a U.N. ban on fishing there.

Ben Zvi stepped in to fill the vacuum, importing the sturgeon to Israel and starting to raise them. Kibbutz Dan now boasts more than 60,000 sturgeon and produces about 6,000 pounds of caviar annually.

"The good chefs in New York are saying that our caviar -- Karat Caviar -- is the best in the world -- and we believe them," he said.

However, Ben Zvi can't speak from personal experience. Kibbutz members can't enjoy the caviar because it's not kosher.

Unlikely as it seem s Israeli produced caviar has been judged as the best in the world. Iranian caviar once held the title but due to pollution issues its export has been prohibited.

Digital media company Perion acquires SweetPacks for \$43m.

Digital media company Perion Network (formerly IncrediMail) has acquired Israeli consumer internet company SweetPacks, for some \$43 million in cash and shares.

Perion offers a selection of products designed to enhance the user's digital experience. Its

SweetIM application allows user to enhance their messaging experience and express in creative ways across online platforms like messenger, Facebook, and email.

“This combination provides meaningful scale and adds improved back-end systems that will strengthen our competitive advantage,” said Josef Mandelbaum, Perion’s CEO. “This acquisition further accelerates our own efforts to scale, adds 22 million new users, creating a larger and more profitable company.”

“This combination is a unique and powerful opportunity to leverage the successes of both Perion and SweetPacks,” said SweetPacks’ CEO, Nadav Goshen, who will join Perion as its new Chief Operating Officer. “I firmly believe in Perion’s vision for the future and am confident that together we can accelerate growth and increase profitability.”

Founded in 2000, SweetPacks generated \$29.7 million in revenues in the 12-month period ending September 30, 2012, with Adjusted EBITDA of \$9.0 million, at a 30% margin. This is 89% higher than 2011 revenues of \$15.7 million and almost double 2011 Adjusted EBITDA of \$4.5 million.

Founded in 2000, Perion is headquartering in Redmond, WA, with a research and development center in Tel Aviv, Israel. The company is traded on Nasdaq (PERI) and TASE, with a market cap of \$90 million.

\$4000-per-jar caviar has socialist origins

Samsung Electronics has unveiled a \$100 million seed fund to support innovation in components and subsystems related to its broad product line.

Samsung Electronics chief strategy officer Young Sohn said that the fund would be focused on Silicon Valley, Cambridge, Mass., and Israel, but could also fund initiatives elsewhere in the

world.

He said, “We’re going to support early stage entrepreneurs and academia. We want to make sure we’re part of the disruptive forces sweeping the technology industry.”

Sohn added that the Catalyst Fund will hand out smaller sums of money than the company’s venture arm - perhaps a couple million dollars - and will hone in on projects related to cloud infrastructure, mobile, human interface and mobile health.

The Korean manufacturer also said it plans to increase its corporate venture investing this year to back the fundamental breakthroughs in digital science that venture capitalists have recently shied away from funding.

To begin the fund, Samsung launched a contest that will award \$10 million in seed investments later this year to entrepreneurs, engineers and artists hoping to use technology to improve people’s lives

Observed: The outburst before the blast

Before they go all-out supernova, certain large stars undergo a sort of “mini-explosion,” throwing a good-sized chunk of their material off into space. Though several models predict this behavior and evidence from supernovae points in this direction, actually observations of such pre-explosion outbursts have been rare. In new research led by Dr. Eran Ofek of the Weizmann Institute, scientists found such an outburst taking place a short time – just one month – before a massive star underwent a supernova explosion.

The findings, which recently appeared in Nature, help to clarify the series of events leading up to the supernova, as well as providing insight into the processes taking place in the cores of such massive stars as they progress toward the final

stage of their lives.

Ofek, a member of the Institute's Particle Physics and Astrophysics Department, is a participant in the Palomar Transient Factory (PTF) project (led by Prof. Shri Kulkarni of the California Institute of Technology), which searches the skies for supernova events using telescopes at the Palomar Observatory in California. He and a research team from Israel, the UK and the US decided to investigate whether outbursts could be connected to later supernovae by combing for evidence of them in observations that predated PTF supernova sightings, using tools developed by Dr. Mark Sullivan of the University of Southampton.

The fact that they found such an outburst occurring just a little over a month before the onset of the supernova explosion was something of a surprise, but the timing and mass of the ejected material helped them to validate a particular model that predicts this type of pre-explosion event. A statistical analysis showed that there was only a 0.1% chance that the outburst and supernova were unrelated occurrences.

The exploding star, known as a type II_n supernova, began as a massive star, at least 8 times the mass of our sun. As such a star ages, the internal nuclear fusion that keeps it going produces heavier and heavier elements – until its core is mostly iron. At that point, the weighty core quickly collapses inward and the star explodes.

The violence and mass of the pre-explosion outburst they found, says Ofek, point to its source in the star's core. The material is speedily ejected from the core straight through the star's surface by the excitation of gravity waves. The researchers believe that continued research in this direction will show such mini-explosions to be the rule for this type of supernova.

Also participating in this research were Prof. Avishay Gal-Yam, Dr. Ofer Yaron and Iair Arcavi of the Institute's Particle Physics and Astrophysics Department, and Prof. Nir Shaviv of the Hebrew University of Jerusalem.

Prof. Avishay Gal-Yam's research is supported by the Helen and Martin Kimmel Award for Innovative Investigation; the Nella and Leon Benoziyo Center for Astrophysics; and the Lord Sieff of Brimpton Memorial Fund.

Two Antibodies are better than one

A new approach mimicking the body's natural defenses could help treat a therapy-resistant breast cancer.

Cancer drugs of the new, molecular generation destroy malignant breast tumors in a targeted manner: They block characteristic molecules on tumor cells – receptors for the hormones estrogen or progesterone, or a co-receptor, called HER2, that binds to many growth factors. But about one in every six breast tumors has none of these receptors. Such cancers, called triple-negative, are particularly aggressive and notoriously difficult to treat.

Some of these therapy-resistant cancers have a potential molecular target for cancer drugs, a growth-factor receptor called EGFR, but an EGFR-blocking drug has proved ineffective in treating them. In a study published recently in the Proceedings of the National Academy of Sciences, Weizmann Institute researchers propose a potential solution: to simultaneously treat triple-negative breast cancer with two EGFR-blocking antibodies instead of one. In a study in mice, the scientists showed that a certain combination of two antibodies indeed prevented the growth and spread of triple-negative tumors. The research team, led by Prof. Yosef Yarden of the Biological Regulation Department and

Prof. Michael Sela of the Immunology Department, included Drs. Daniela Ferraro, Nadège Gaborit, Ruth Maron, Hadas Cohen-Dvashi, Ziv Porat, Fresia Pareja, and Sara Lavi, Dr. Moshit Lindzen and Nir Ben-Chetrit.

Of the different combinations they tried, the scientists found that the approach worked when the two antibodies bound to different parts of the EGFR molecule. The combined action of the antibodies was stronger than would have been expected by simply adding up the separate effects of each. Apparently, the use of the two antibodies created an entirely new anti-cancer mechanism: In addition to blocking the EGFR and recruiting the help of immune cells, the antibodies probably overwhelmed the EGFR by their sheer weight, causing it to collapse inward from the membrane into the tumor cell.

Deprived of EGFR on its surface, the cells were no longer receiving the growth signals, preventing the growth of the tumor. This approach resembles the natural functioning of the immune system, which tends to block essential antigens at several sites by targeting them with multiple antibodies. If supported by further studies, the two-antibody approach, in combination with chemotherapy, might in the future be developed into an effective treatment for triple-negative breast cancer.

Research Council; and the Marvin Tanner Laboratory for Research on Cancer. Prof. Yarden is the incumbent of the Harold and Zelda Goldberg Professorial Chair in Molecular Cell Biology.

At a first-of-its-kind conference for ultra-Orthodox Jews

Racheli Ganot, a 35-year-old mother of three, has 100 women working for her today at Rachip, the semiconductor development firm in

Bnei Brak she founded five years ago. They are all ultra-Orthodox Jews. So is she.

“There are lots of people out there who still don’t know what to make of us,” she acknowledged, speaking Tuesday at a first-of-its-kind Haredi high-tech conference. “Semiconductors has always been a field dominated by men. So it’s quite interesting that we in the Haredi community are actually helping close the gender gap in this field.”

Ganot, who is about to open a second development center for her firm in Haifa, was addressing a special session on Haredi high-tech entrepreneurship at the conference, which was held in Jerusalem and organized jointly by the JVP venture capital firm and the Haredi Hi-Tech Forum.

Born and raised in Bnei Brak, Ganot was introduced to the world of high-tech at the age of 16, she said, when she took a first basic course in computer programming. “It opened an entire new world for me,” she recalled, “and I decided I wanted to go deeper into it.” In an unusual move for a woman of her background, she decided to pursue a degree in computer science. “I worked in the semiconductor industry for six years, and at one point, while I was working as a team manager, I realized just how difficult it was to recruit skilled workers in this field. I figured there had to be other Haredi women like me out there interested in this field, and I decided to go for it. I set up my own company. I had no experience whatsoever in business but lots of technical know-how, and that’s how it started.”

The initial funding for the project, which was minimal, came out of her own pocket. By contrast, Nili Davidovitch, the founder of Daat Solutions, an outsourcing center in Tel Aviv that specializes in cellular and web development, needed outside investors to get her project off

the ground.

And that, she says, was one of the biggest obstacles she faced as a Haredi entrepreneur. “People in the high-tech world here just don’t know us,” she told the forum. “We don’t serve in 8200 (the Israel Defense Forces’ prestigious military intelligence unit) and we’re not graduates of the Technion,” she said. “But what we do have are lots of fears.”

The challenges, she said, are even more daunting for female entrepreneurs in the Haredi community. “We grow up hearing constantly how important it is for us to maintain modesty as women,” she noted. “And suddenly we’ve got to go out there and sell ourselves – well not ourselves, but our ideas. It goes against everything we’ve been taught.”

Davidovitch, a mother of five, eventually did find an investor to back her project, but like any Jewish mother, particularly one brought up on the ethos of modesty, she preferred using the podium today to boast about her son rather than herself. “He’s not even 25 years old yet, but he’s about to complete his third exit this week,” she kvelled.

g began, though, during the break when business cards were exchanged - between men and women as well - over bagels and coffee (“it’s all Glatt Kosher,” an organizer reassured the crowd).

Boaz Sharon and Yanki Har-Tzvi, two Haredi entrepreneurs, were trying to interest potential investors in their month-old venture, a website that allows users to design their own personalized Jewish-themed gifts. Avi Kohen, who described himself as a serial entrepreneur, was looking for workers to man the portal he recently created that helps consumers discover great bargains in Bnei Brak. Avraham Orbach, the founder of a new online interest network project, said he had just come to observe. “I’m

still in stealth mode,” he said. “It’s too early to look for investors.”

JVP founder Erel Margalit, who is also running on the Labor Party Knesset list, said the conference coincides with the Haredi workforce entering a new stage of development. “There’s been a huge change in the past 10 years,” he said. “A lot of high-tech work that used to be outsourced to India is now being outsourced to Haredim at centers in Modi’in Illit and Kiryat Sefer. But many of these Haredi workers now also have their own ideas and are becoming part of the creative process in the high-tech world.”

Krombie said that the conference organizers had invited all the Haredi members of Knesset to attend, but they all declined. “It’s difficult for them to come to an event like this, where Haredim are being encouraged to join the workforce,” he said.

A number of Haredi women gathered around Ganot during the break, wondering how she managed to juggle kids and career. “Everybody helps,” she told them. “My husband helps, the grandparents help. The kids actually like seeing different faces every day.”

“You know, high-tech is actually a perfect career for a Haredi woman,” one of her interlocutors mused. “She gets to sit in front of a computer, she doesn’t have to mingle with men, and she can bring her work home on a flash-drive.”

It’s not only the Haredi women who face unique challenges in high-tech, said Kohen. “Before I had my portal, I used to work in a computer hardware company. Once I delivered some equipment to a client, who had never seen me in person before. You know what he said when I walked in? He said: ‘We’ve already made our contribution this year.’ That’s right, he saw a Haredi guy and immediately assumed I was there to ask for donations.”

Amdocs, SingTel found joint Israeli development center

Asian telecommunications group SingTel and software solutions provider Amdocs Ltd. (NYSE: DOX) announced today that they are setting up a joint development center in Israel.

The two companies said that this was the first collaboration of its kind by an Asian telecommunications provider in Israel, and that it would open doors for Israeli start-up companies. SingTel's entry into Israel is part of its strategic plan to boost investment in research and development.

The aim of the center that will be opened will be to turn innovative technologies into commercial products for customers of the SingTel group in the 26 countries in which it operates.

SingTel did not disclose details of the size of its investment in Israel, but according to Allen Lew, CEO of SingTel's Digital Life group, the company has a corporate venture capital fund amounting to \$150 million, part of which will be invested in Israel.

Lew did not rule out the possibility that SingTel would acquire an Israeli company. In the past, the Singapore-based company bought Amobee, whose activity is advertising on mobile telephones, and this is an area that interests SingTel currently as well. Other areas of interest are games on mobile telephones, and online commerce.

Australia approves Mazor Robotics spinal surgery device

The approval covers the sale of the Renaissance navigation robot for both spinal and neurological procedures.

3 March 13 12:40, Globes' correspondent

inShare9

Mazor Robotics Ltd. (TASE:MZOR) today announced that it has obtained approval from Australia's Therapeutic Goods Administration (TGA) for the import and sale of the company's Renaissance navigation robot for spinal surgery.

Mazor added that the approval covered the sale of the Renaissance navigation robot for both spinal and neurological procedures, on the basis of its application. It said that, during 2013, it plans to initiate activity sales of the Renaissance system in Australia through a local distributor, LifeHealthcare Distribution Pty Ltd., with which it already has an agreement.

The Australian and New Zealand spinal surgical market is estimated at \$250 million.

Mazor CEO Ori Hadomi said, "I am pleased at our initial foothold in the Asia-Pacific market. Expanding marketing activity to Australia is



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